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No. 2203

United States
Circuit Court of Appeals

For the Ninth Circuit.

Transcript of Record.

(IN THREE VOLUMES)

MORSE S. DUFFIELD and LEWIS A. JEFFS,

Appellants,

vs.

SAN FRANCISCO CHEMICAL COMPANY,
a Corporation,

Appellee.

VOLUME II.
(Pages 305 to 592, Inclusive.)

Upon Appeal from the United States District Court for the District of Idaho, Southern Division.

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(Testimony of Guy Sterling.)

Q. How is that spelled? A. R-e-m-s-e-n.

Q. Any others?

A. I don't remember any others in particular now, although there are others.

Q. You are sure of that?

A. Quite sure of it, because I remember a number of different chemical books. It is too trifling to mention some of it, of the small investigations [347] in the matter.

Q. As to your work in the field, making examinations of phosphate rock, where and when did you first begin the examination of phosphate rock in the field?

A. On the Bradley lode, in and on what is called the Crawford Mountain District, east of Randolph.

Q. When was that?

A. As I say, I think it was in 1906.

Q. All right. Tell us what you did out there.

A. In the first place you want the geological part of it? You don't care anything about anything else?

Q. I don't care anything about what you done surveying.

A. I went simply through and examined the claims and noted the different workings, practically on the same line of testimony I have given here in regard to this group of claims shown on Exhibit No. 1; examined the rock and took the different strikes there and noted the formation, the width and thicknesses of the vein—dip and strike of the veins, and determined whether the rock was in place, and made

(Testimony of Guy Sterling.)

a report to the Government about it.

Q. Now, coming back to your examination. What did you do while you were upon the ground, by way of a detailed examination of this rock?

A. I took the dip and strike of the veins.

Q. I mean as to the characteristics of the rock itself.

A. I took samples of the rock, and tested them qualitatively myself, and then had them tested quantitatively by Officer & Co., to determine whether they were limestone or phosphate rock, and also to determine by Officer & Co. the percentage of [348] calcium phosphate the samples contained.

Q. You did not assist in that test?

A. I did not assist Officer & Co. in that, but I did, as I have said, I made my own independent examinations to determine as to whether phosphate or not.

Q. Where? On the ground?

A. Took the samples to my office, and did the work there.

Q. Now, how long were you there studying these Bradley lode claims?

A. Well, I suppose I was off and on there on that particular branch of the work, I should say probably about two weeks.

Q. Two weeks?

A. But, of course, I was on the ground, you understand, a month or probably six weeks altogether, but this two weeks' work was for the particular purpose of this geological, or we will say this mineral report, and those two weeks' work there was a sort of a

(Testimony of Guy Sterling.)

concentration of all the observations that I had tried to make while I was making my surveys of the ground and workings and the formation, to the end of it, so that it would be absurd to say that the two weeks' work was the only time that was devoted to gaining the knowledge that I used in making these reports.

Q. I see. How long after you made that examination in the Crawford Mountains did you make the report?

A. As I remember it, I made it immediately as soon as I got through with the field work.

Q. Now, when you were up making these examinations, did you at that time have any interest in phosphate claims yourself?

A. Yes; I had an interest. I don't wish to be anything except perfectly frank about that matter. I had an interest **[349]** in some claims, but I will not be positive now that I had that interest before or after I made these examinations. My impression is now that I did not have that interest in those claims until after I had finished that examination.

Q. Where were the claims in which you had an interest?

A. They were a continuation to the south of the Bradley group, and are east of the claims of Jeffs and Duffield, which lie in the Crawford Mountain district.

Q. But on this same deposit?

A. Part of this same formation?

Q. Yes. A. Yes, sir.

(Testimony of Guy Sterling.)

Q. Now, did you look at those claims?

A. I made a survey of some of them for Thure Crownholm.

Q. You made the surveys for him?

A. For him, and he located them.

Q. He located them? A. Yes, sir.

Q. And it was in these claims you had interests?

A. Yes, sir.

Q. Do you know whether that survey was before or after you went out to make the examination of the Crawford Mountain country?

A. Repeat that question.

Q. Did you make this survey for this man, whose name I cannot repeat, before you made the examination upon which you based the government report?

A. No; as I say, it brings up the same matter that you spoke of before, but I think my impression is that I surveyed those claims for Crownholm subsequent to my examination for these government reports.

Q. How long subsequent?

A. I don't think it was very long, probably was not more than two or three months, and it might possibly have been before. **[350]**

Q. It might have been? A. Yes, sir.

Q. You are not sure now whether or not it was before? A. No; I am not sure about that now.

Q. And at the time you made this government report, from which you read on yesterday, you had this interest in those claims?

A. I say I don't know; I am not sure about it. It

(Testimony of Guy Sterling.)

may have been and may not.

Q. The report was made, of course, after the examination was made out there?

A. Yes, sir; but my interest may not have occurred until I made the report and until after I made the examination. It might have been before then, for all I know.

Q. You have no distinct recollection?

A. I don't remember now. I can look it up and determine absolutely about that.

Q. Will you do that? A. Surely.

Q. All right. At the time you made this examination for the Bradley Brothers, did you have any prospective interest in phosphate rock, that you know of—have you any distinct recollection of having any prospective interest in phosphate claims?

A. I would like to know what is meant by prospective.

Q. Well, did you have any agreement or understanding with any of the parties, that you should become a part owner or interested in any claims of phosphate rock? A. No.

Q. You had none, unless it was—

A. Unless it was as I say.

Q. Unless in these claims?

A. Unless I had acquired that before.

Q. Now, who sent you out to make this report, or this examination? **[351]**

A. I received an order from the Surveyor General to do it.

Q. Of Utah? A. Yes, sir.

(Testimony of Guy Sterling.)

Q. And you were at that time a Deputy Mineral Surveyor? A. Yes, sir.

Q. And have been since? A. Yes, sir.

Q. And at this time you are a Deputy Mineral Surveyor? A. Yes, sir.

Q. There has been no time intervening when you have not been? A. No.

Q. All right. Now, going a little further, what other studies of phosphate rock did you make after, in addition to the Bradley lode claim?

A. None other, except the examination that I have made for Jeffs and Duffield.

Q. In 1910? A. 1910, yes, sir.

Q. And on how many occasions did you visit this particular territory where these claims were located?

A. I went up, as I said in my testimony, October 29, October 30, and November 15, I think it was, of 1910.

Q. Well, November 15th was the Wyoming claims?

A. Yes, sir.

Q. So that two days is the only time that you spent on the Montpelier group of claims, was it?

A. That is the only time I spent in the field on it.

Q. That is what I say; and of course that covered the extent of your examination of it?

A. No; I could not spend any more time there to any advantage; if I could why I would have done it.

Q. On the Thomas Fork claims you spent how long? I mean by that those shown on Exhibits "A" and "B."

A. As I say, I think we were there one day.

(Testimony of Guy Sterling.)

Q. Did you make any chemical analysis of any of this phosphate [352] rock taken from these claims?

A. Not personally.

Q. That is, either in Idaho or Wyoming.

A. Not personally.

Q. When you went over these claims did you take any measurements as to the extent of the deposits?

A. Yes, sir; I think I remember distinctly of measuring the thickness of the vein in several places. I remember distinctly of doing that, I think, in the Obey lode, and probably did it in a number of others. I had a tape-line along, and I measured wherever I wanted to be very exact. Where I did not, where it did not seem of particular importance whether the vein was 4 feet thick or 6 feet thick, I probably estimated with my eye.

Q. In making these measurements you are speaking of now of having measured, it was simply the bed?

A. The individual bed of phosphate rock, or the individual wall.

Q. Yes. In other words, you did not make any measurements of the balance of the series?

A. No; there was no place I could do that, because it was not well enough uncovered anywhere to make it certain.

Q. At no place on the lode?

A. Not in that group, as I remember it.

Q. Did you make any search to find a place where you could examine and measure the width of the various strata throughout this series?

(Testimony of Guy Sterling.)

A. Well, I did not—well, I had that in mind to do that, make that examination, if there was a good opportunity to do it, and if there had been a good opportunity to do it I would have done it.

Q. Have you in mind any search of that kind in your examination?

A. No more than making an examination of the whole thing, [353] in trying to see and observe everything there was pertaining to the subject.

Q. Did you take any cross-sections of the series?

A. Only such as were readily obtained in the workings.

Q. That was simply of one bed?

A. That particular working upon and across that bed, and in some places it cut it, but how much particularly I have forgotten now. I think I mentioned in my testimony that there was several places where two or three beds were cross-cut by the tunnels.

Q. Did you take cross-sections where they were cross-cut?

A. As I said, some of them were measured carefully. I remember particularly I think in the Obey lode, but generally though I would estimate with my eye the general thickness, and counted the number of beds that appeared to have been cut, and that was all.

Q. Did you make any maps or illustrations?

A. I remember of doing that I think on the Obey lode, and probably on some of the others, and wherever—

Q. Probably. Don't you remember whether you did or not?

(Testimony of Guy Sterling.)

A. No, I do not. I can look in my notes and see, if you like.

Q. Yes; I would like to know.

A. I have a little cross-section here taken of cut No. 5, looking southerly.

Q. Where is that? A. That is on the Obey lode.

Q. All right. Any others?

A. I have another one here at cut No. 8.

Q. Is it an illustration, or simply a notation of what you found?

A. I will show you, if you care to look at it. It says here, [354] cut No. 5 looking southerly; that is the surface, and this is going in the cut with the tunnel, and there it says "face," and there marked "phosphate rock," "lime," and "lime" again.

Q. That illustration is merely a rough sketch that you drew out with a pencil, without regard to any measurements? A. Yes, sir; it is measured.

Q. And drawn to a scale?

A. It is not drawn to a scale, but the measurements are given, and I have got in my notes the size of that, or estimated the size of that cut.

Q. Give us the measurements.

A. I could draw it off if necessary, make a very approximate drawing to a scale, if necessary.

Q. Give us the measurements of the different strata.

A. I have got estimated here, or stated, in the face of the cut limestone, and then I have a bed of limestone 5 feet thick.

Q. Limestone first, and then a bed of limestone?

A. No; the face was phosphate rock.

(Testimony of Guy Sterling.)

Q. And then a bed of limestone 5 feet thick?

A. And then a bed of phosphate 5 feet thick, and then a bed of limestone which in thickness was not completely shown. I only say cut in there, and I have not got the thickness of that.

Q. How thick was it, as far as you measured it?

A. I can't tell you.

Q. You did not measure?

A. I did not measure that, because I was going to try to get the thickness of these beds clearly shown.

Q. Now, have you made any other examinations upon the ground of [355] phosphate rock, other than what you have stated?

A. Have I made any other examinations of phosphate rock?

Q. On the ground? A. This ground?

Q. Any ground in the west, and if so where and when?

A. Well, just to be complete, probably of no particular importance, I examined west from that ground that deposit that crops out of west Duffield and Jeffs' ground in the Crawford Mountains.

Q. Well, when was that? At the time you made—

A. Well, that was after, I think, I made these surveys for Crownholm that I mentioned at that time.

Q. That same time, the same visit?

A. Oh, no, a different visit.

Q. Did you go out there for the purpose of making a study of the phosphates at that time?

A. I went out there to look over the ground. Of course that would be a study of phosphates so far

(Testimony of Guy Sterling.)

as it occurred in the field.

Q. Did you go out to study that, or go out to survey?

A. I went to look over the ground, to see what the deposit amounted to, how large it was, and the quality it appeared to be, etc.

Q. Any other examinations on the ground?

A. I don't remember of any other.

Q. Now, Mr. Sterling, calling your attention to this deposit, what do you call that deposit?

A. Deposit of rock.

Q. Is that the only name you give it? A. No.

Q. What is it? What do you call it?

A. I call it a deposit of calcium phosphate.

Q. You used the term phosphorite in your direct examination. [356] Is it phosphorite?

A. I think that is the proper name for it. You understand that these are hair splitting distinctions. You can call it phosphorite, if you want to, and if you don't want to you don't have to.

Q. I am asking you what you call it.

A. I think it is proper to call it a phosphorite.

Q. What is phosphorite?

A. Calcium phosphate.

Q. Is that the only definition you can give of calcium phosphate?

A. It generally implies *to in* uncrystallized form of calcium phosphate.

Q. Can you give the constituents? A. Yes.

Q. What are they?

A. That I can give you, my idea of phosphorite.

Q. I am asking you if you can give me the consti-

(Testimony of Guy Sterling.)

tuents of phosphorite.

A. My definition of phosphorite would be uncrystallized calcium phosphate.

Q. I am not asking you that.

A. Calcium phosphate is a chemical combination of phosphorus, oxygen and calcium.

Q. Is that all that is necessary to constitute phosphorite? A. I think that is enough.

Q. I am not asking you if enough, but I am asking you the constituents of it.

A. I think it is enough. It might have impurities in it; it might have lime in it, and it might have alumina in it, and it might have silica in it, and might have free lime in it, but I think it would be in either case a phosphorite.

Q. Don't you know that phosphorite must contain—don't you know that phosphorite, that one of the constituents of phosphorite **[357]** is chlorine?

A. It may be, but I don't think it is absolutely essential.

Q. I am asking you as a geologist.

A. I don't know that it is absolutely necessary.

Q. Don't you know that the texture of phosphorite must be fibrous?

A. No; I think not. I think that it may or may not be fibrous. I think you could use the term phosphorite without regard to any hair splitting distinctions like that.

Q. Don't you know that phosphorite must have a certain density, or gravity, a given density and a given gravity?

(Testimony of Guy Sterling.)

A. I don't think so, in a general way.

Q. I am not asking you in a general way, but as a geologist.

A. I don't think so as a geologist, in a general way.

Q. What do you mean by that?

A. I mean exactly what I say.

Q. What do you mean by a general way?

A. I mean all of these things cannot be—these distinctions cannot be applied in such a hair splitting and definite way as your questions would imply.

Q. That is your opinion of it. I am asking you certain questions, and I want, if you can to give me answers to them. I ask you whether or not it is not essential, from a geological standpoint, for the substance to be phosphorite, that it have a given density or gravity?

A. No, I think not. I think it could vary.

Q. Isn't it necessary, for the substance to be phosphorite, that it have a lustre, a given lustre?

A. I think not. I think that could vary.

Q. What do you call apatite, Mr. Sterling? [358]

A. That I would consider the crystallized form of calcium phosphate, where it occurs in nature.

Q. How is it distinguished from phosphorite?

A. Well, it is crystallized. It has a definite, generally a definite form, a crystalline form, and apatite generally does contain other things besides calcium phosphate.

Q. You think it does?

A. I think, as a rule, it does.

(Testimony of Guy Sterling.)

Q. This calcium phosphate contains other things, too?

A. Yes, sir; this is not pure calcium phosphate, by any means.

Q. Is the only distinction between apatite and phosphorite, that the apatite is crystalline?

A. No.

Q. What other?

A. No. I think that is the main difference, but apatite generally contains, I believe, some flourine in combination, in chemical combination with the calcium phosphate.

Q. Now, coming again to the question of these deposits. You read in your report, which you made to the Department, that the veins of this phosphate rock lie in the same general way as veins of valuable and metallic mineral in the Rocky Mountains and Pacific Coast region?

A. I don't think I read that, Mr. Budge.

Q. I think you did. You can look at your report and see if it is not in that.

A. If I may be allowed to explain, if you have got one of them, does that apply to the Lorine lode location there?

Q. It is a Government document, is all I know about it. It is a pamphlet published at the Government printing office. [359]

A. I made a number of reports, and that is one of them. I don't think the one you have is the one, unless it says Lorine lode location.

Q. Yes. Mineral Entry 3093, Lorine lode.

(Testimony of Guy Sterling.)

A. I don't think I read that statement, which you read there, although it is undoubtedly in this report.

Q. I think you did.

A. If it says it there, it is correct. Will you read what is in that report?

Q. "The veins of this territory lie in the same general way to those of valuable metallic minerals in the Rocky Mountains and Pacific Coast region."

A. You might read a little more before and after that. I can't locate that here.

Q. That is the beginning of the whole paragraph. I might read the whole paragraph, but I will ask you just whether that is a part of the report that you made, or whether that is your idea of those deposits.

A. I am not able to find that statement in here at all.

Q. Have you the Lorine lode report there?

A. This is the Lorine lode report.

Q. If it is not there we will go into another feature.

A. You had better go into some other matter.

Q. I will call attention to something else apart from that.

A. I don't think that is in the Lorine report, that sentence that you read.

Mr. DEY.—What are you reading from?

Mr. BUDGE.—I am reading from the report of the phosphate land hearings before the Committee on Public Lands, in the House of Representatives in 1909. [360]

Q. You say here in this report—I will ask you if

(Testimony of Guy Sterling.)

you made this statement in your report:

"The existence of the veins of phosphate rock may be accounted for by supposing that a bed of limestone originally occupied the position of one of the veins of phosphate rock, and that the bed of limestone was covered, while in its original horizontal position, with a bed of animal and vegetable remains, shells, excrement, and other material containing free phosphoric acid and soluble phosphates." Is that right?

A. Yes.

Q. You made that?

A. Yes, sir; I have that here.

Q. "Water percolating from above through this mass carried the phosphoric acid and soluble phosphates down to the underlying bed of limestone. By the contact of the phosphoric acid and the soluble phosphates with the limestone, chemical action was brought about, resulting in the formation of a bed of calcic phosphate, where originally was a bed of limestone. In the course of time other beds of limestone and calcic phosphate were successively and alternately deposited one above the other through the entire series of veins." Is that right?

A. That is right.

Q. Now, calling your attention to this particular paragraph, I will ask you to explain what your idea is as to this phosphate being collected, or phosphate rock being collected. Give it a little more in detail than given in this paragraph.

A. I don't believe I can very well. That explains

(Testimony of Guy Sterling.)

it as well as I know how, and in detail as much as I can do so.

Q. Let me ask you this, then; You say that there was percolating [361] waters from above through this mass, that is, from the vegetable remains, shells and excrements, and so on, which carried phosphoric acid and soluble phosphates down to the underlying bed of limestone, and by contact with the phosphoric acid and soluble phosphates with the limestone, chemical action was brought about? A. Yes, sir.

Q. What chemical action would be brought about?

A. Well, the phosphoric acid, as the name implies, is an acid, and the underlying bed being, for instance, a bed of limestone, mud or marl, of course, when the acid came in contact with the lime it would act upon the lime and it would have a chemical reaction.

Q. There would be a chemical reaction from the contact of the phosphoric acid with the limestone?

A. Yes, sir.

Q. There would? A. Yes, sir; I think so.

Q. Tell us what it is.

A. Why, limestone is carbonate of lime.

Q. Yes.

A. And the carbonic acid gas would be set free, and the acid phosphate would take its place in combination with the lime.

Q. What set the carbonic acid gas free?

A. Why, the action of the acid on the carbonate of lime.

Q. On the carbonate of lime? It would have that effect? A. Yes.

(Testimony of Guy Sterling.)

Q. Is that all that is necessary to set the carbonic acid gas free, simply to put phosphoric acid in contact with limestone?

A. I think so, if they were, yes; that is my understanding of it. [362]

Q. In other words, if you take a piece of limestone and put it in contact with that phosphoric acid, the carbonic acid gas would be liberated, would it?

A. I think so.

Q. That is your understanding as a chemist?

A. That is my understanding of it.

Q. As a chemist?

A. It might be necessary with the water, to have in addition the phosphoric acid in it, perhaps some carbonic acid to make the limestone a little more soluble.

Q. Would it be necessary?

A. Probably, to get such wholesale results as we get here, it would be necessary.

Q. It would be necessary?

A. Yes, sir; it could easily occur.

Q. Now, is it your idea, according to this paragraph, and do you intend that you shall be understood as saying that this calcium phosphate, as it is found in this region, was at one time a limestone bed?

A. A part of it was.

Q. Was it? A. I say a part of it.

Q. Was the area covered by this particular deposit, the zone of this particular one, or one of these particular beds of calcic phosphate, was that at one time limestone?

(Testimony of Guy Sterling.)

A. Oh, I would not say that positively, because that would be a pure matter of theory; all that I know or I pretend to know is—I don't pretend to know that—it is purely a matter of theory, I think. Or, in other words, it seems possible and probable that that deposit of calcium phosphate took place in some such manner as I have described here, but I do not say that is absolutely so.

Q. And then your idea is that there was a leaching of this [363] phosphoric acid from the phosphate deposit, or the deposit of phosphatic matter, there was a leaching from that bed down into the lower bed of limestone?

A. Yes, sir; that seems probable.

Q. Do you think that that is a reasonable solution, in view of the fact that—in view of the uniformity of this bed? A. Yes, sir.

Q. Of calcic phosphate? A. Yes, sir.

Q. How do you explain it? Isn't it true such a leaching usually leaves it irregular?

A. No; it depends on the physical forces that were at work there, as well as chemical forces, and how long a time it was going on.

Q. It might have been for a million years, for all anybody knows and can determine now?

A. There is no objection to the theory that I gave in that report, due to the fact that the bed lies in even and uniform form.

Q. Well, I will ask you particularly as to the uniformity of the quality of the grade in some particular places, we will say. If one of these beds of phosphate rock or calcium phosphate at some par-

(Testimony of Guy Sterling.)
ticular point, where we will say the vein is 5 feet in thickness— A. Yes.

Q. Now, it is true, isn't it, that the quality of that calcium phosphate, the percentage in it is practically the same in that particular place throughout?

A. It is in many veins there very uniform in grade.

Q. Isn't it true, taking any vein, a cross section of any vein of this phosphatic rock at any particular part, it would be uniform in quality throughout that vein? Isn't that generally [364] the condition throughout that?

A. That general condition is true, but you must remember that some of these veins look 4 or 5 feet thick, and close examination will show that they are split up into two or three thinner veins, although the walls may be very thin.

Q. But irrespective of the thickness of the vein, whatever it may be, taking a cross section of the vein itself, what you call the vein of phosphate rock, the quality of the vein is practically the same throughout?

A. Yes, sir; that is pretty uniform in grade.

Q. Now, then, in view of that uniformity of grade, do you consider that this leaching process is the manner in which that phosphatic bed was laid down?

A. I do not see anything inconsistent with that, because, as I said, there were physical conditions there that we know nothing about; the time elements we know nothing about, and we don't know whether this is a beach that gradually receded, or whether it was the bottom of a sea and deposited in that way, or whether it was a beach that extended out into the

(Testimony of Guy Sterling.)

ocean. We do not know any of those conditions, and I see nothing in the fact that the quality of the rock is uniform between the walls of any individual vein, to lead me to think that there is anything particularly unreasonable in that theory.

Q. Well, now, if your idea is that this calcium phosphate bed, one of these calcium phosphate beds was formed, was at one time a limestone bed, and that from above by a leaching process, the phosphoric acid and soluble phosphates came down into this bed of limestone, is it reasonable to suppose—I am [365] asking you as a geologist—is it reasonable to suppose by this leaching process the limestone rock would be impregnated with the phosphatic material in the same degree and with the same uniformity as it is found in one of these beds?

A. I don't think I have stated that it was a bed of limestone rock; I said of marl or limestone mud, some soft material that the acid would have a better chance to act on.

Q. Let me read to you.

A. If I have given unqualifiedly the opinion or statement in there that there was a bed of hard, solid limestone lying under this acid, that was not my intention.

Q. If you have given the idea, it was a hard bed of limestone, then your leaching process idea would not be well founded?

A. It would not be applicable to the extent I have stated. I am satisfied, and I know that I stated in there, or given the explanation rather of the rock becoming consolidated afterwards, showing I did not

(Testimony of Guy Sterling.)
consider it was a solid bed of limestone at the time this chemical action took place.

Q. You have stated the way the existence of the veins of phosphate rock may be accounted for, by supposing that the bed of limestone originally occupied the position of one of the veins of phosphate rock. That is correct, isn't it?

A. Yes; but that is not saying that the limestone is solid and hard.

Q. And it is not saying that it is soft either?

A. Well, I imply that afterwards.

Q. Where?

A. I say in the next paragraph: "Consolidation and concentration of the beds of [366] calcic phosphate thus formed were brought about by the pressure of subsequently deposited formation." That does not change the condition of concentration of the beds of calcic phosphate thus formed. Now, you can't have consolidated a thing already solid, can you?

Q. I am asking you. You say here in the next paragraph: "Consolidation and concentration of the beds of calcic phosphate thus formed—" Now, I am trying to get at the manner of their formation.

A. I will explain it. I say again it was not my idea, and while it may not be explained elaborately there, it must be assumed that the limestone was probably in a condition so that it was easy of attack by the phosphoric acid.

Q. In other words, your idea is then it was a soft bed of limestone?

A. Probably a soft bed of limestone in the shape

(Testimony of Guy Sterling.)

of what we call marl now, practically a limestone mud.

Q. A limestone mud?

A. Yes, sir; it was if wet.

Q. And it was wet, you say?

A. If it were wet it would be a mud.

Q. That is quite true; if it were wet it would be a mud. Now, Mr. Sterling, what evidences in the field from the examination of these phosphate deposits that you have made, what evidence have you, and what did you see and observe on these deposits to indicate that there was a leaching process?

A. I did not see anything there in the field.

Q. There is not any physical evidences, so far as you now can remember, by which you can justify a leaching process?

A. I don't remember of seeing anything in the field. [367]

Q. That, as you say, would lead to or show any indication of a leaching process.

A. I do not mean to say by that that there are not any, but I say I have not seen any or noticed any.

Q. Now, you have testified, I think, or it appears in your report that this calcium phosphate is oolitic in character. Is that correct?

A. Yes, sir; the phosphate rock is oolitic.

Q. Now, let me ask you in your judgment as a geologist, if it could be oolitic as it is found, and have been established by a leaching process?

A. Well, it could be oolitic in connection with this theory of the deposition, that which I give in my report, because I think that oolitic form is, at least

(Testimony of Guy Sterling.)

I should suppose that the oolitic form is due to the calcium phosphate being in a finely divided and rather a loose condition, being mixed up with little fragments of perhaps organic matter, or little particles of shell, and being rolled around and moved in and out and up and down by a wave action, would have a tendency to bring it to this oolitic form.

Q. In other words, the oolites are formed, are they not, from a washing process?

A. I can imagine that, or from a wave action.

Q. Isn't that pretty generally understood among geologists, that oolites are the result of a washing process, wave action, or some other—or water movement?

A. I think that is all right. It is a good theory, reasonable. [368]

Q. Isn't it established?

A. I don't think that it is anything that is established. I don't know of anybody that has seen anything of oolites being made or in course of formation now.

Q. In other words, it is beyond dispute, so far as geologists are concerned, that that is the manner in which oolites are formed?

A. Oh, I don't think there is any controversy about it.

Q. Now, then, your idea as I gather it, and I want to understand the paragraph that you have referred to, your idea is, when this leaching process was going on, that the phosphate or the phosphoric acid was in solution? A. Yes, sir.

(Testimony of Guy Sterling.)

Q. Now then, if that were in solution and transmitted in solution down to the other underlying bed of limestone, as you have stated, could it be in its present form oolitic?

A. If the underlying bed of limestone was soft and muddy.

Q. Do you mean to say that the soluble phosphate, or the phosphoric acid in solution could go down in the bed of limestone, and after it got down there make oolites?

A. It could if it was soft and the water receded so as to bring it down to an evenly exposed beach there of limestone mud and phosphoric acid together, mixed up with organic remains, etc.

Q. But where was this layer of shells and excrement and phosphatic material?

A. That might have gone down from the inland waters, with the water.

Q. It was above the limestone, according to this report, was it not?

A. It was above it at one time. It might have been deposited in very fine layers on it, and it might possibly [369] have come along at the same time with the lime. This theory in the report is merely a theory.

Q. Merely a theory?

A. I don't say the only theory, and I don't say that it is an absolutely correct theory.

Q. What I want to get at is whether or not your idea of this situation was not this, that there was a bed of limestone, and which you afterward stated was a soft bed, and above that was a layer or deposit

(Testimony of Guy Sterling.)

of phosphatic material, such as excrements, shells, bones, and so on. That is correct, isn't it?

A. Yes, sir; that is correct enough.

Q. And in respect to that further, that the water percolating through this mass of phosphatic material carried the phosphoric acid in solution and the soluble phosphates in solution, down to this underlying bed of limestone. Is that correct?

A. Yes, sir.

Q. Now, then, after this had been going on for an unknown period, this underlying bed of limestone, by the impregnation of the soluble phosphates and phosphoric acid, came to be the bed which is now known as the calcium phosphate? A. Yes.

Q. Now, then, under that process the phosphoric acid and the soluble phosphates leaching down in solution, I ask you now as a geologist whether or not the calcium phosphate bed as thus formed, could be oolitic? A. Yes, sir.

Q. How do you explain it?

A. If it were soft and porous, and not consolidated, it could be easily rolled around and brought into oolitic form by wave action. [370]

Q. Could it be rolled around when deposited above the bed and between it and the waves?

A. We are speaking of it after it had acted upon the limestone below, or marl below.

Q. What became of all this deposit which the water percolated through? The wave action was prevented by that deposition, was it not?

A. That was also probably a part of the bed.

Q. Was it all one bed? A. I should think so.

(Testimony of Guy Sterling.)

Q. The limestone and phosphatic material?

A. I think probably that was all there was in the bed except the water.

Q. Do you mean to say that the limestone underneath and the phosphatic material was all put in there at one time? A. Please say that again.

Q. Do you mean to say that the phosphatic material and the underlying bed of limestone, and which was transmitted by percolation, was all laid down at one time?

A. No; I don't say that, although it might in some modified form, something of that kind might occur.

Q. Now, if not laid down at the same time, or if it is not probable that they were laid down at the same time, the underlying bed of course was laid down prior to the phosphatic material bed, was it not?

A. Yes, sir; under that understanding.

Q. Under that understanding, which you say is a probable understanding?

A. It is a possible and probable one, but not by any means the only one.

Q. But it is a probable one. Assuming it to be a probable one, [371] then this bed of phosphatic material from which the phosphoric acid was taken by percolation, would be between the underlying bed of limestone to which the phosphoric acid was percolated, and the waves, would it not?

A. Yes, sir; but that bed of phosphatic material that we speak of there might have been practically or simply a mass of water and very finely divided material, which was practically all phosphatic material except the little impurities which we find in

(Testimony of Guy Sterling.)

the rock, and might even now be a part of the phosphate rock.

Q. Your idea then is, after this phosphoric acid and soluble phosphates came down into this underlying bed of limestone, that the oolites were formed thereafter?

A. I said the oolites were formed after the phosphoric acid had acted upon the limestone mud.

Q. And that this mud was changed into an oolitic structure?

A. The oolitic formation I think probably is due, as I said before, to the motion given to the particles by water.

Q. Notwithstanding the fact that the bed of phosphatic material from which the phosphoric acid was percolated, was above the limestone bed into which the phosphoric acid came?

A. It was above at one time. It was not above after the oolitic formation was made.

Q. If it was not above after, where was it?

A. It was with it; then a part of it. The limestone had been replaced then by the phosphate.

Q. And then the phosphate bed from which the phosphoric acid was taken by percolation, was simply mixed then with [372] the limestone bed, was it, in this material there together that was left to remain?

A. The same amount of lime there in the first place, or calcium, and perhaps some that was soluble in the water, due to its carbonic acid gas—my supposition is, and it is purely a supposition,—that the limestone that was in the mud is there now, and

(Testimony of Guy Sterling.)

instead of being a carbonate of lime it is a phosphate of lime.

Q. And that the oolites were formed after the percolation took place?

A. And the oolites the phosphate rock being now in an oolitic form, of course it must have been calcium phosphate when it was formed and made into oolitic shapes.

Q. You mean it must have been calcium phosphate?

A. Calcium phosphate before it became oolitic.

Q. In other words, this bed of limestone was impregnated first with phosphoric acid and soluble phosphates as a bed. Is that correct?

A. Well, I would not—well, we will say that as a bed, keeping in view that the beds were subject, and open as I said before, to the attack of the acid.

Q. Open to the attack of the acid, and that the acid impregnated this bed all the way through, establishing the uniformity which it now has in grade and percentage of phosphoric acid?

A. That might possibly have been altered afterwards by conditions we don't know anything about.

Q. What is your idea about that?

A. I haven't any idea. I don't pretend to have, and I haven't formed any opinion about that, because it is rather remote; too many things there I don't know anything about. [373]

Q. At least, after the impregnation of this bed of limestone mud by phosphoric acid, after that bed had been thoroughly impregnated by this phosphoric acid and soluble phosphate, then this whole bed was

(Testimony of Guy Sterling.)

changed by water action to an oolitic form?

A. I would not be quite so definite and positive as you are about that.

Q. I am not. I am asking you. I am not positive. I am not a geologist, Mr. Sterling.

A. I am as positive and definite as your question implies then.

Q. All right.

A. That might have taken place. Those beds might have been deposited in thin layers, step by step, and so we can't say, you know, that any 4 foot vein was packed down hard and solid by itself, and then another one on top of that. It might have been placed an inch at a time, and hundreds and hundreds of years between.

Q. Or millions of years?

A. I don't suppose millions of years for an inch, but it might have been.

Q. Isn't it reasonable to suppose that these oolites were formed by the phosphoric acid and by the phosphates being brought down from land areas and became segregated from this excrement and other materials there, and being washed around in comparatively shallow water were gradually covered or brought together by the deposit of calcium from the water?

Mr. DEY.—We object to this, because all of this inquiry is immaterial, and that a continuation of this examination on this line is incurring needless and useless cost and expense; that the question of the origin has no importance at all to the question at is-

(Testimony of Guy Sterling.)

sue in this case. **[374]**

Q. Now, answer the question.

A. Why, that theory perhaps has some good, rational basis, but it is purely a theory, and I would not say it is any better or any worse than mine.

Q. Isn't it more reasonable as to the formation of the oolites?

A. From my studies of the thing, it does not seem any more reasonable than mine.

Q. No more reasonable? A. No.

Q. I understood you to say on direct examination, Mr. Sterling, that the value of this phosphate rock, as it is commonly termed, depends on the percentage of phosphorus. Is that correct?

A. That is my understanding as to the value of it.

Q. Have you had any experience in the use of this material?

A. No, no. I don't say that it depends altogether on that; I say it depends almost altogether on that.

Q. Now recurring just a moment to this line of questions in which we were engaged before just now: Isn't it your idea, Mr. Sterling, that after these oolites were formed and this oolitic construction had taken place, that there was then a concentration and consolidation by which the strata became solid?

A. I think the formation of the oolitic structure probably constituted itself a concentration.

Q. In other words, the uniting of the oolites brought about the concentration, or a cementing together. Is that so?

A. No; I say when the material was brought in,

(Testimony of Guy Sterling.)

when it finally took an oolitic form, I say I consider that constituted the concentration?

Q. Oh, that was the concentration? [375]

A. Yes, sir; and that was afterwards, it seems probable to me. Of course, it was consolidated, because we find now it is solid.

Q. And it was in practically the same condition, so far as solidity of it is concerned, probably?

A. Well, it is in the same condition after it became consolidated that it is now. I don't think there has been any change since, of any importance.

Q. In other words, it became solid by this oolitic formation or construction of it. That was when the beds became a solid formation?

A. Well, I would say that when—after that became oolitic in form that it was after that consolidated.

Q. After it became oolitic?

A. After it became oolitic in form it was consolidated, and with the exception of the moisture or something of that kind that might have been evaporated out of it, or leached out of it, or squeezed out of it; it is probably the same form and grade now as it was then.

Q. Whenever it became solid, and it is practically the same as now, so far as solidity is concerned?

A. Yes, sir; I don't think there has been any change to speak of since.

Q. Now, when it became solid it is your idea, is it, that it was in a horizontal position?

A. Yes, sir; I think probably practically flat.

(Testimony of Guy Sterling.)

Q. And if it were in that condition it would, under present conditions, be properly locateable as a placer? A. I think not. [376]

Q. You think not. For what reason?

A. Well, one reason is that the rock is valuable on account of the contained mineral, and not as a whole.

Q. Now, let us inquire into that and see. Have you had any experience in the treatment or use of this work? A. No.

Q. And what knowledge have you as to the manner in which it is used?

A. I have obtained my knowledge from reading and from inquiries among fertilizer manufacturers.

Q. Now, explain to us what your idea is as to the manner in which this material is treated and used.

A. The general and most common way of preparing the phosphate rock for fertilizer purposes is simply to treat it with sulphuric acid, whereby the calcium phosphate, as it exists in the rock, is brought into a soluble form, due to the action of the acid and heat, which is brought about by the chemical reaction itself; so that when the rock, after it has been treated with acid, is spread over the ground, the phosphorus is in chemical combination and it is in a soluble form so that plants can take it up.

Q. How do they mix the sulphuric acid with it? Do you know?

A. Well, they generally grind the rocks up very fine, I presume—we will assume for illustration that the rock is a pure calcium phosphate, with no impurities; then the amount of acid used is in direct pro-

(Testimony of Guy Sterling.)

portion to the amount of phosphorus in that, and, of course, that is in direct proportion to the amount of calcium there is in it, so that they know how much to put in to bring about the reaction. [377]

Q. How do they treat this particular rock—not whether it was pure calcium phosphate, but how do they treat this particular rock?

A. I think that is the general way of treating that.

Q. Mixing with sulphuric acid? In what way?

A. Yes, sir; I described grinding it up finely and mixing it together and bringing about a chemical reaction between the sulphuric acid and the calcium phosphate.

Q. Is that all they do, according to your idea?

A. If they want—if they simply want to use the rocks in that shape, without mixing anything else with it; or if they do not care to extract the phosphoric acid from it I believe that is all they do with it; just use the rock in that shape.

Q. That is all they do?

A. Of course, they might treat it with other substances, depending on what is wanted—

Q. Do they?

A. They may; depending, I say, if they want to use it as a fertilizer they use it just as it comes, but if they want a neutral or alkaline fertilizer they may treat the super-phosphates after the rock has been treated with sulphuric acid, they may treat it with lime again and get it in a neutral shape.

Q. It is not a question of what they may do. Do you know what they do, as a matter of fact?

(Testimony of Guy Sterling.)

A. They do all of these things I have described.

Q. And that is your knowledge upon the subject, is that they do treat this in different ways for different purposes?

A. Yes, sir; all with the view of bringing the phosphorus into such shape that plants can take it up.

Q. Who does this work, and where done? [378]

A. Done at the fertilizer manufactory.

Q. At the fertilizer manufactories?

A. Yes, sir.

Q. And for other purposes?

A. Well, if they use the rock for other purposes besides fertilizers, it might not all be done at the fertilizer manufactory.

Q. For fertilizer purposes it is all done there, is it? A. Yes, sir.

Q. Do you know whether or not they do those things there that you say?

A. I have seen it being done at a fertilizer factory in Sandusky, Ohio, but at that factory, as I observed, they used very little of the rock alone; they always mixed it with other things.

Q. Was that phosphate rock? A. Yes, sir.

Q. When you saw it? A. Yes, sir.

Q. Now, do you say that this would not be a placer, because they mine it for the mineral contents? Is that correct? A. That is one reason.

Q. What is the mineral contents?

A. Phosphorus.

Q. Now, isn't it true that it is not mined for that at

(Testimony of Guy Sterling.)

all, but for the combination of the calcium and phosphoric acid?

A. No. The essential value of the rock is due to its phosphorus contents.

Q. And not for its phosphoric acid contents in connection or in combination with calcium?

A. No; if you had a pure bed of phosphorus—well, I will put that in another way—if it was possible to get phosphorus by itself it would be very easy to get the lime and other things to mix with this. [379]

Q. That is true, but isn't it true that it is valuable because of the calcium that is now in combination with the phosphoric acid? A. I don't think so.

Q. Now, is there a particle of phosphorus in this rock?

A. I don't say that there is. There is phosphorus in it, but not in the uncombined form.

Q. They don't mine it in order to get out any phosphorus in the uncombined form?

A. Not for fertilizers, but they do when they want phosphorus.

Q. I am asking about the fertilizers, and that is what it is mined for? A. Not exclusively.

Q. Out of these beds?

A. It may be now, but that does not apply to the future.

Q. There is not any phosphorus in it?

A. Not uncombined.

Q. And they don't mine it for phosphorus?

A. They do not now, but they may mine phosphate rock for phosphorus.

(Testimony of Guy Sterling.)

Q. They do not, and you don't know of any institution or any place where phosphate rock, this phosphate rock—this deposit we are speaking of, this phosphate rock is treated to extract the phosphorus?

A. You are referring now directly and exclusively to this?

Q. I am referring to—

A. The claims shown on Exhibit No. 1?

Q. Yes.

A. I don't know where that is shipped to, or what it is used for.

Q. And if phosphate and phosphate rock—do you know of any phosphate rock that is mined for the purposes of extracting the phosphorus uncombined? [380]

A. That is mined for the purpose of extracting the phosphorus uncombined?

Q. Yes. A. I have been told of that by—

Q. Do you know it, I am asking you?

A. I only know it by reading and by hearsay.

Q. By reading and hearsay?

A. I have never followed up any load of phosphate rock to see whether it was taken to the factory and used for the manufacture of phosphorus.

Q. Isn't it true that the calcium in combination with phosphoric acid, as it is in this rock, is a very beneficial and material element in these fertilizers?

A. It may be, under some conditions.

Q. Isn't it under these conditions?

A. Not invariably.

Q. Isn't it under these conditions?

(Testimony of Guy Sterling.)

A. I don't know whether it is under these conditions, any more than under other conditions.

Q. I ask you if you know.

A. I don't know; I do not say so it should be.

Q. You say you don't know?

A. I say I don't know of any condition for the conclusion that this rock is and will be mined largely on account of the contained calcium.

Q. Do you know, as a matter of fact, what this rock is mined for?

A. I believe, and it is my opinion it is mined on account of its contained phosphorus.

Q. You base that simply on what?

A. On general knowledge of the use of phosphate rock.

Q. All on your general knowledge of the use of it?

A. Yes, sir. [381]

Q. Now, that phosphate rock is used as a fertilizer? A. As a fertilizer.

Q. That is true.

A. It is not used that way, because that is the best way to use it; it is used that way because it is the most convenient, I think, and practical way of using it.

Q. Or commercial way of using it?

A. That all amounts to the same thing; nevertheless it is the phosphorus they are after.

Q. That is your idea of it?

A. That is my idea; if there was not any phosphorus in that rock it would not be mined for fertilizer purposes.

(Testimony of Guy Sterling.)

Q. Do you mean to say that it is mined for the purpose of getting this phosphorus out?

A. To put that phosphorus in shape for the plants to use.

Q. Now, don't you know, Mr. Sterling, that the plant cannot use phosphorus not combined, and could not take it up? A. I did not say it did.

Q. Could it?

A. Not unless it was in soluble form.

Q. Could they take up phosphorus uncombined?

A. They could if in a soluble form, for all I know.

Q. Do you know? A. I don't know.

Q. As a chemist?

A. I believe they could if it was in soluble form.

Q. As a chemist, do you know whether they could?

A. That the plants take up phosporus?

Q. Uncombined?

Mr. DEY.—I would like to inquire what this has got to do with the issues in this case. [382]

Mr. BUDGE.—The particular materiality of this testimony is based on the statement of the witness that this is not a placer for the reason that it is mined for its mineral contents only, to wit; the phosphorus.

Q. Did you ever know or hear of such a thing as phosphorus in solution, uncombined phosphorus?

A. No; I don't believe it will go in solution alone.

Q. And, therefore, the plants could not take it up?

A. As I say, it has got to be in solution.

Q. It would be in solution, it must be, in order to take it up? A. The phosphorus?

(Testimony of Guy Sterling.)

Q. Yes.

A. You can put it in the shape of phosphoric acid.

Q. You said you wanted it in solution. I am asking you how you get it in solution?

A. By making phosphoric acid out of it, and it is—

Q. Is it phosphorus?

A. It is not phosphorus uncombined, but phosphoric acid.

Q. So that phosphorus uncombined is not a soluble substance then? A. Not in water.

Q. Is it not a soluble substance?

A. Not in water.

Q. It is simply an element of nature?

A. It is an element of nature; no question about that.

Q. Now, it must have calcium in it in order to enable the plant to take it up after this treatment?

A. I don't agree to that.

Q. You don't agree to that. What do you say about it? A. I say—

Q. You say it is not a fact? [383]

A. I say that taking phosphorus, starting out now with pure phosphorus—

Q. I am not asking you about pure phosphorus.

A. I am answering your question in my own way.

Q. I want you to answer my question without any put-in.

A. You take phosphorus in pure shape and dissolve it in acid, making phosphoric acid, and then dilute it with water and mix it up with another substance, earth, sand, or anything that you like, and

(Testimony of Guy Sterling.)

spread it out upon the ground, the plants will be able to get the phosphorus from that phosphoric acid in that shape, and it is not necessary to put any lime with it at all.

Q. Are you satisfied with that statement?

A. I am satisfied with that, from what I have read and have been told by manufacturers of fertilizers.

Q. Now will you answer my question. Do you or do you not know the impossibility of a plant taking up phosphorus uncombined?

A. Well, I will have to answer that the way I did before, that it has got to be in a soluble form. It may be possible to dissolve phosphorus, to a small extent, in water, if you take time enough, and then it would be uncombined.

Q. Is that the best answer you can make me to my question?

A. I think that is the best answer, and a proper answer.

Q. That phosphorus uncombined can be taken up?

A. If it can be brought into a soluble form.

Q. I am not asking that question at all. Answer the question. In an uncombined form is phosphorus capable of being taken up? [384]

A. I will ask you to explain that.

Q. You are not asking me. I am asking you.

A. I will have to know what you mean by an uncombined form.

Q. I mean the element phosphorus, uncombined with any other element.

A. I have to have some sort of a concrete idea of

(Testimony of Guy Sterling.)

the subject. I am trying to answer your questions. Now then, I am assuming, in answering your question, if there is a chunk of phosphorus lying in a field, as big as your fist, I will undertake to say that the plant will take it up.

Q. And that is the only form, in a solid way, that you find phosphorus uncombined?

A. You don't find it uncombined at all. You have to manufacture it.

Recess until 2 P. M.

Q. As I understood you, Mr. Sterling, you stated that the reason why this bed, after it had become solid and in a horizontal position, the reason why, under present conditions, it would not be locateable as a placer, is for the reason that it is mined for its mineral contents. Is that correct?

A. Yes, sir; as distinguished from the rock as a whole.

Q. Now, calling your attention to a lime quarry, and that is mined for its mineral contents, isn't it, as distinguished from the rock as a whole?

A. Yes, sir; but that is a difference of a placer as compared with a quarry, and if this was to be located as a placer of phosphate rock, it would have to be located under a special application of the placer act to quarries.

Q. So far as the fact that the substance is mined for its mineral [385] contents, now bearing in mind that element alone, there is no difference in mining this for its mineral contents as a placer, and there would be no difference in mining gold for its

(Testimony of Guy Sterling.)

mineral contents as a placer, would there, bearing in mind that element alone?

A. No; in both cases they are mined for the valuable contents.

Q. Yes. Then calling your attention to limestone, which is mined for use as calcium oxide, that is mined also for its mineral contents, isn't it?

A. It would in that particular instance, but that is a very narrow construction, as compared to the purpose for which limestone quarries are located.

Q. I am speaking of this particular purpose.

A. It is very possible you might locate as a placer a limestone deposit, for the purpose of making oxide or hydrate of calcium.

Q. And that would be the only way to locate it, would it not, as a placer; that is, it is not located in mining operations in any other way?

A. I don't think you could properly locate it in any other way.

Mr. DEY.—I object to that as calling for a conclusion of law.

Q. And calling your attention to gypsum or calcium sulphate, that too is mined and located as a placer, isn't it? A. Yes, sir.

Q. And that is mined for its mineral contents?

A. Mined as a rule— [386]

Q. Almost overwhelmingly so?

A. —for its use as a whole.

Q. And it is not mined for the calcium that is in it, is it? A. As a whole.

Q. Nor for the sulphate that is in it?

A. Not that I know of.

(Testimony of Guy Sterling.)

Q. And it is mined for the calcium sulphate.

A. It is mined for the calcium phosphate, and that is what gypsum is.

Q. I mean calcium sulphate.

A. Calcium sulphate.

Q. That is used as a fertilizer, and is located and mined as a placer?

A. Sparingly, that and other uses.

Q. It is used that way? A. It may be used.

Q. And is? A. To some extent.

Q. Commercially? A. Yes, sir; to some extent.

Q. Now, isn't it—

A. I want to explain my answer a little more definitely. It is not used in the sense of a fertilizer that phosphate is used. There is a vast difference, and I feel I have a right to explain this.

Q. Yes, you have. You are perfectly right on that.

A. It is used more for its mechanical effect upon the soil, except in connection with alkaline rock, and phosphate rock is treated and put into condition for use as a fertilizer after treatment with sulphuric acid, and it is the chemical result that we desire to obtain, and not, except to a very slight degree, the mechanical effect.

Q. And then do you make a distinction between the mode in which [387] calcium phosphate and calcium sulphate should be located, simply by reason of the different way in which they affect the land upon which they are placed after they are prepared?

A. My reply to that question is to bring out the point that the use of phosphate rock as a fertilizer

(Testimony of Guy Sterling.)

involves chemical treatment, whereas the use of gypsum as a fertilizer does not necessarily require or involve chemical treatment.

Q. Now, then, if that is true do you make the distinction between a location of gypsum, the manner of locating gypsum and the manner of locating phosphate rock, make the distinction because of the fact that one is—because of the different manner in which they affect the land on which they are placed?

A. Not on account of the effects, except as one element more, on account of the fact that one requires chemical treatment to make the contents which is desired available, and the other does not require chemical treatment.

Q. Now, then, do you make a distinction, or do you say that phosphate rock should not be located as a placer, because it is treated chemically after it is mined?

A. I would not put it so briefly as you do, but that involves my reason, yes.

Q. That is a reason? A. Yes.

Q. All right. I want to get your reason. Now, calling your attention—

A. I would like to make a little further statement. That is one reason, is what I want to add.

Q. Now, you say that, calling your attention to your statement that this would not be a placer after it became solidified, and in its horizontal shape and position because of the [388] fact it is mined for its mineral contents: salt is also located as a placer?

A. Yes, sir; under a special act.

Q. And it is mined for its mineral contents?

(Testimony of Guy Sterling.)

A. It is mined for itself as a whole.

Q. Mined for its mineral contents?

A. Mixed up with any impurities it is, but it is usually mined in a practically pure state as a whole, and used as a whole.

Q. It is not mined for the sodium in it?

A. It might be.

Q. Is it used for commercial use?

A. Frequently it is mined for the purpose of manufacturing sodium from the salt.

Q. But all salt mines locateable, which are located as placers, are nevertheless mined for their mineral contents?

A. I would not put it that way, Mr. Budge. I would say the salt was mined for the salt.

Q. And what is salt? It is sodium and chlorine, isn't it? A. Yes, sir.

Q. Now, it is not mined for the sodium, and it is not mined for the chlorine? A. No.

Q. But it is mined for the sodium and the chlorine?

A. In the sense I speak, neither chlorine or sodium would be salt. It is the combination that makes salt, and they are mined for the salt.

Q. And it is the combination of the phosphoric acid and the calcium that you mine, that is to say, the reason you mine it?

A. That is not the only reason that you mine it, you mine it [389] on account of the phosphorus in the rock.

Q. Calling your attention to borax, or Colemanite, known as calcium and borax, that is mined as a

(Testimony of Guy Sterling.)

placer, isn't it? A. Mined as a placer?

Q. Yes.

A. Of course, I can't go into the subject of how mined; you mean located?

Q. I mean located, yes, sir.

A. I believe that all there are in this country are located as placer.

Q. And that is mined for its mineral contents?

A. Yes, sir; that is mined in two ways, I believe, for use as a whole in the purified state, and also for the manufacture of boric acid, and some for the borax.

Q. And for washing substances?

A. Yes, sir; just for manufacturing purposes.

Q. Yes. Now, then, that is simply calcium borate, and this is calcium phosphate?

A. I must say I am not well acquainted with the chemical formula of borax.

Q. Well, calling your attention to coal: that is mined for its mineral contents?

A. A special act, located under a special act.

Q. A modification of the placer law, but located as a placer. A. No; I think not.

Q. What is the difference?

A. It is located by a special act—

Mr. DEY.—I object to that as wholly immaterial and improper.

A. You can make a special act for anything [390] you locate and then it is outside of that class.

Q. In what manner does a coal location differ from a placer location, an ordinary placer location?

Mr. DEY.—I object to that as calling for a conclu-

(Testimony of Guy Sterling.)
sion of law; and all of this is immaterial. The only question is as to the form in which the deposit is found, being in rock in place, and anything as to the law governing coal, or any other special act, is wholly immaterial.

A. I say—perhaps I had better ask you to repeat the question.

(Question read.)

A. Why, there is simply a difference in this, that one is coal and is located under a special act, and a placer location has a broad significance as compared with that. There are several special applications of law to the placer act.

Q. I am not asking you as to what acts it is located under. I ask you to tell me the difference in the manner of locating coal and other placers.

A. To locate coal—

Q. If you know.

A. I can give it to you in a general way, just from my knowledge of the application of the law, that you apply to file on 160 acres, or whatever number of acres you want.

Q. File on it?

A. Make an entry, I should say. You file at the United States Land Office, within the district that the coal occurs.

Q. In making that filing of course you make an application to enter the coal lands.

A. I think that is about all there is of it.

Q. It is by the acre?

A. It is by the acre, and you finally purchase it of the Government. [391]

(Testimony of Guy Sterling.)

Q. And which you do of a placer claim?

A. Yes, sir; you do eventually, except you have to do assessment work on the placer, and you don't, as I understand it, on a coal claim.

Q. Nevertheless, it is taken up by acres?

A. Oh, yes; all Government land is taken by acres.

Q. Well, what I mean, taken by the acre, is taken by acreage in a different form from what a lode is, and you are confined to your side lines on a coal location as you would be in a placer location strictly?

A. Yes, sir.

Q. Now, in this report, Mr. Sterling, from which you read, you use the term here—you make the statement, as I understand it, that this is a sedimentary deposit? A. I think so.

Q. An original sedimentary deposit?

A. Yes; of course, that is just my opinion.

Q. An original sedimentary deposit?

A. Yes, sir.

Q. Now, in this report you state that in giving the description of the series:

1st: Hard, silicious, dark blue limestone hanging-wall.

2nd: Vein of good grade phosphate rock, dark brown in color, 9 feet thick.

3rd: Thin stratum or wall of shale.

4th: A vein of high grade blue gray phosphate rock, 4 inches in thickness,—4 feet in thickness.

5th: Thin wall of shale.

6th: Vein of good grade dark brown phosphate rock, 14 feet thick. [392]

7th: Wall of black chert, and so on.

(Testimony of Guy Sterling.)

Now, why is it that you call this a vein, and the limestone and the chert walls?

A. Just the same as you would in a metal mine, to distinguish the valuable part of the deposit from the invaluable part of the walls.

Q. Well, suppose that you are intending, or desired, or anyone else, for that matter, desired to mine this intermediate strata of limestone. You would not call that a vein, would you?

A. No; I would call it then a bed of limestone, the same as if it was a solid vein of gold running through there, with limestone walls, if a man wanted to locate that as a limestone bed, why he would have a perfect right to do it, but he would have to exclude the gold, however, from the placer location.

Q. I am talking about a bed of limestone without gold. If he intended to locate on the limestone strata you would not call that a vein, would you?

A. No.

Q. Now, as a matter of fact, from your description of the manner in which this deposit was laid down, the deposition of the two beds was practically the same? A. Both sedimentary.

Q. And both laid down in practically the same manner? A. Probably.

Q. And the same as a bed of sandstone would be laid down, as a matter of fact?

A. Well, probably similar, of course. I say probably similar.

Q. As a matter of fact, Mr. Sterling, isn't it true that in this [393] Montpelier Canyon, when you went over this ground, and which you inspected, that

(Testimony of Guy Sterling.)

there is a showing that underneath the calcium carbonate is a bed of sandstone?

A. Yes, sir. I think we saw that up in the Obey and Obed lodes.

Q. And that sandstone and calcium carbonate and calcium phosphate and the chert are all beds or strata originally sedimentary beds or strata of the earth's crust? A. I think so.

Q. Now, is that the only reason why, the one you have given me, why you call this a vein, simply because it is the particular portion of the series which is sought and which is located upon?

A. And is valuable.

Q. And is valuable?

A. For its mineral contents.

Q. Well, is that the only reason? Any other reason?

A. The other reasons are that it is in place.

Q. I mean so far as defining it to be a vein.

Mr. DEY.—That is perfectly proper.

A. That is what I am trying to answer. It is a vein because it is in place and has walls, and generally speaking, a well defined dip and strike.

Q. Now, then, the limestone and the chert and the calcium carbonate are all in place?

A. In place and form walls of the phosphate rock, and consequently have practically the same dip and strike.

Q. And that I say: they have the same characteristics of a vein in the strike, dip, etc., as have beds of phosphate rock.

A. That is true of all veins. [394]

(Testimony of Guy Sterling.)

Q. I say it is true of this.

A. It is true of this and true of all veins.

Q. So that the mere fact that this calcium carbonate has a dip and strike to it does not entitle—or the mere fact that the sandstone and the intermediate beds between the phosphate layers have a dip and a strike to them, would not give them the right to have the same vein at all?

A. No; because they have no value on account of the mineral contents.

Q. They have no value on account of mineral contents. For limestone they would have for the lime, for the calcium oxide, would they not?

A. Not in my opinion.

Q. It would not have that?

A. Not in my opinion.

Q. What would it be mined for?

A. Be mined for the limestone as a whole.

Q. And not for its mineral contents?

A. Not in my opinion, speaking as a whole and in general.

Q. In other words, you determine—

A. Of course, I am going ahead now a little further. You want to get this down very fine. The distinctions are, of course, difficult to determine on any hair-line, but you might go to work and take up a marble quarry, or a common worthless limestone quarry, for the purpose of the extraction of the calcium metal itself.

Q. That is true; but that would not be the general purpose of taking up a limestone quarry.

A. It was not the purpose in view when the law in

(Testimony of Guy Sterling.)

regard to placers and lodes was made by the United States Congress? [395]

Q. That is your opinion about it?

A. That is my opinion of the whole thing, so far as I am concerned, as a matter of opinion, whether these claims should be properly lode claims or placer claims.

Q. Don't you know, as a matter of fact, Mr. Sterling, that there are a great many beds of limestone that are quarried and located as placers, for the purpose of getting the lime to be used as calcium oxide?

A. You mean for the purpose of making lime, that they use in making mortar?

Q. Yes; and I will go further, and say for the purpose of getting this lime and using it commercially as a fertilizer.

A. Yes, sir; but in that case it is used as a whole.

Q. And it is mined in that manner, or located in that manner? A. Not in this western country.

Q. I am not asking about the western country.

A. Well, there are no placer claims anywhere else except in the west.

Q. Where is this located?

A. I mean located in the sense you use it there, that limestone quarries are worked for that purpose, the extraction of limestone for fertilizing purposes.

Q. Well, for building purposes then?

A. Yes, sir.

Q. There are a great many of those?

A. Oh, yes.

Q. Where it is mined for building purposes?

A. Yes, sir.

(Testimony of Guy Sterling.)

Q. And if the limestone has calcium oxide—

A. Yes—I must go ahead a little further now. The fact still [396] remains that that calcium oxide is not, strictly speaking, a chemical result; it is not the result of the chemical treatment of the rock itself; it is merely brought about by calcining the limestone.

Q. And then, you still stay with the same idea which you expressed, that the manner of locating this calcium phosphate should be determined by the manner in which it is treated after it is mined?

A. That is one important point.

Q. Now, you have stated during your experience in examining mines in different districts, of veins of ore and the manner of their occurrence in different strata, haven't you? A. Yes, sir.

Q. And paid attention to those conditions?

A. Yes, sir.

Q. Now, other than what you have stated, that is to say, other than the fact that this is valuable for its mineral contents, that it has a dip and a strike the same as the limestone and chert and calcium carbonate that go with it, and has the same strike as this, and has this calcium phosphate there are no other characteristics of a vein, as it is commonly understood in mining? A. Now, I think you—

Q. Can't you answer?

A. I can't answer it yes or no, because—I will ask you to read the question.

(Question read.)

Well, no, your question involves the fact, or im-

(Testimony of Guy Sterling.)

plies and admits the fact that it has got a dip and strike and walls, does it not? [397]

Q. Yes; as you have defined it.

A. Yes, sir; and then, we will admit the chemical part of it pretty thoroughly, and with that understanding I will say that I think there is no other condition there necessary to make it proper for a lode location.

Q. I didn't ask you that question.

A. I don't know of any condition that is missing.

Q. No; answer my question.

A. I think I am answering it; I am trying to.

Q. I asked you if it had any of the characteristics of a vein. I did not ask you whether it was properly locateable as a lode, but whether it has any characteristic of a vein, as the word vein is commonly understood in mining.

A. I think it has every characteristic of a vein, as understood in mining.

Q. I say other than what you have given me?

A. No; but that is what I am trying to say, that I do not at this present moment think of any other characteristic that a vein could have, that this vein has not already, speaking in a general way.

Q. Well, let me ask you this. Isn't it true that a vein, as it is commonly understood in mining, and by a vein I mean with a mineral ore zone located as a lode, that the mineral substance is of a later—that is, comes into the mineral zone later than the country rock? A. Yes, sir.

(Testimony of Guy Sterling.)

Q. In that respect this differs from a vein, does it not?

A. It differs from some veins, but the law don't. [398]

Q. I am not asking you about the law. I am asking you about a physical fact.

A. You are asking about a miner that locates these—

Q. I am not asking you anything about a miner locating or with reference to a placer or a lode. I have not asked you that question at all. Answer the question.

A. The deposit of phosphate rock was older than one wall and younger than the other.

Q. Now, that is not true with the ordinary vein, as it is understood in mining, is it?

A. You mean now according to scientific mining?

Q. No; I am talking about practical mining.

A. Yes; practical mining.

Q. Or scientific either.

A. Not invariably; as a rule in metal mines the fact is that the deposit of ore is younger than the walls, yes.

Q. In that respect this differs from an ordinary vein as you understand it?

A. It differs from that kind of a vein.

Q. It differs from what is commonly understood to be a vein among miners, and in the mining business? A. No; I don't think so.

Q. You don't think so. All right. Then, let me ask you this: the manner in which this calcium phos-

(Testimony of Guy Sterling.)

phate comes into place is not the same as the manner in which the ore body of a vein comes into place?

A. It is owing to the manner in which it gets into all veins; the manner in which it comes into this vein. [399]

Q. I am not talking about this vein. I am talking about veins that are known to be locateable as lodes.

Mr. DEY.—All veins are locateable as lodes.

A. I cannot make that discrimination, Mr. Budge. I do not—

Mr. BUDGE.—On that theory you are very anxious to make your answer apply—

A. I don't mean the—

Mr. DEY.—I object to that remark. There is no occasion for it at all.

Mr. BUDGE.—I think there is.

Mr. DEY.—He is endeavoring to answer the questions, so far as they are intelligible.

Mr. BUDGE.—I think that the remark is justified by the witness's disposition to be evasive and not to be candid.

A. Well, I have got something to say about that. I am being as candid as I know how. I simply don't intend to have my answers misunderstood and construed in either a broader or a narrower way than I think they should be.

Mr. DEY.—I will state further, for the purposes of this case, that the learned counsel for the San Francisco Chemical Company may make a statement as to his theory of the origin and genesis of the

(Testimony of Guy Sterling.)

phosphate vein or lode, that it may stand for the purposes of this case.

Mr. BUDGE.—We will do that when we come to put in the evidence for the defendant. **[400]**

Mr. DEY.—I offer it so that you can do it now, and thereby save time. We make no point upon it, one way or the other.

Mr. BUDGE.—We will reserve that right until we come to our defense, as we have a right to do.

Q. I will ask you, Mr. Sterling, whether there is any vein, as it is commonly understood in mining, any vein, as the word vein is commonly understood in mining, of any nonmetallic mineral, save and except the one case referred to of Webb against the Asphaltum Company—excepting that case, do you know of any other nonmetallic mineral veins?

A. Are you speaking in respect to nonmineral, in the sense that a chemist uses that according to his definition?

Q. I am speaking of it in the sense that miners use it.

A. Well, I must say I don't know exactly where the miner draws the line between a nonmetallic substance and a metallic substance.

Q. Then, I will ask you to express yourself as a mining man, or a mining engineer, whether you know of any other nonmetallic mineral vein than the one to which I have referred?

A. I don't recollect any now.

Q. Then, I will ask you whether or not, Mr. Sterling, it is not true—I will ask you this,—as a geolo-

(Testimony of Guy Sterling.)

gist—that the deposits which are found in what are commonly understood to be veins, were injected into a crevice or fissure in the rock, of course, after the formation of the fissure?

A. May have been. [401]

Q. Is not that the commonly accepted idea among geologists?

A. Not universally. I have no objection to admitting that, the truth of what your question implies, but I will simply say this though, that among geologists there are a great many theories in regard to the formation of ore bodies, and I don't think any of them claim that that is the only way an ore body can be formed or occur.

Q. Do you understand that there is any dissent from that idea among geologists?

A. I have heard of other theories than that.

Q. Who are they? What theories, and who announce them?

A. Why, they are theories that the deposition of ore in the veins may be due to concentration and gather together in the fissure the mineral from the side walls; it may come from below; it might possibly come from above, and it might be an eruptive mass.

Q. But always this ore, or mineral rather, whichever you may term it, comes into the fissure; whether from above or below or from the sides, after the formation of the fissure? That is the accepted idea among geologists?

A. That is classed as generally true, but often a

(Testimony of Guy Sterling.)

fissure is formed by chemical action of metals in the form of salts, etc., or acids, etc., being in the water and eating away the walls, and making deposits in the cavity that had been eaten away.

Q. But nevertheless, the substance for which the miner is seeking, and which constitutes the valuable property, comes into the fissure after it is created, whether it is created **[402]** by this eating away, or whether by some internal force that parts the rock?

A. Yes, sir; it is a concentration in the crevice.

Q. Yes; in the crevice. Now, is there any crevice to this calcium phosphate deposit?

A. No; I have said it was a sedimentary deposit.

Q. Now, let me ask you this, if it is not true that in the use of the term vein, as understood in mining, that the deposit in the vein is of varying degrees of thickness? Do you know of a particular vein?

A. Sometimes they vary, and sometimes they are very uniform.

Q. Do you know of any vein that is uniform for any great extent, or to any great extent?

A. Yes, sir.

Q. Where?

A. I remember one particularly, over in Bingham, a bed of low grade copper and iron pyrites, that was, as I remember it, that was about 4 feet thick, and it didn't seem to vary at all.

Q. For what distance?

A. Well, as I remember it, the shaft, which was an incline shaft, was driven down about 400 feet in

(Testimony of Guy Sterling.)

depth along the vein, and then, I think there was a drift at the foot of the incline 300 or 400 feet, and the vein seemed to be of uniform thickness of low grade copper ore.

Q. Uniform thickness?

A. Between the beds of quartzite.

Q. And did you examine that personally?

A. Yes, sir; I am speaking about what I have seen.

Q. I see. I thought perhaps it was something that you learned from reading.

A. No; I saw it. **[403]**

Q. And you examined it carefully yourself?

A. Yes, sir; I went down in the mine itself.

Q. Did it have a uniformity such as you observed in this calcium phosphate deposit?

A. It did, as far as any of these workings extended. I don't say that bed of low grade copper ore extended indefinitely at that uniform size, or anything of that kind. It was uniform for those dimensions I have given you.

Q. Now, is that the only instance that you can relate?

A. That is the only one I remember of seeing, as I remember of that kind. I have seen beds of iron ore, though, that were practically as uniform as any of these beds.

Q. Beds of iron ore? A. Yes, sir.

Q. Where? A. Down in Iron County.

Q. Down in Southern Utah. Now, they were not in the form of a vein, were they?

A. They were located as lodes; yes, I call it a

(Testimony of Guy Sterling.)

vein, a contact vein.

Q. A contact vein?

A. Yes, sir; and it was decided from the evidence given in this court that it was a replacement.

Q. We won't go into the replacement question, but we will stay with this question of a vein. Isn't it true that usually and in the vast majority of instances the ore deposit, in what is commonly known as a vein, does vary in thickness?

A. It is a very common occurrence.

Q. And it is the most common—in fact, it is unusual when it occurs as you have described it over in Bingham? **[404]**

A. It is unusual in that camp; that is the fact; and I say that that is usually the case with veins, that the extent of the ore body, or thickness of the ore body is not the same.

Q. It is not uniform, in other words?

A. No; not often. I have seen copper deposits, come to think of it, carbonate of copper in sandstone that was very uniform.

Q. Did you ever see any that extended for a distance of four miles?

A. I have not seen any that extended a distance of four miles on the strike, but on the dip pretty near that far.

Q. But not on the strike? A. No.

Q. But as you say, ordinarily a vein is one which varies in thickness? A. Yes, sir.

Q. And it is one also, Mr. Sterling, which varies in extent; and by that I mean there is no uniformity

(Testimony of Guy Sterling.)

as to the extent of the vein along the strike—following the strike of the vein it pinches out in a great many instances in veins of ore?

A. Yes, sir.

Q. And it is found in pockets?

A. That happens in all ore deposits, I think, of every kind.

Q. It is found in pockets? A. Yes, sir.

Q. And in that respect it is different from the usual and ordinary vein; it is different from a calcium phosphate deposit?

A. Different in degree. I don't think there is any difference **[405]** absolutely.

Q. Isn't it also true, as you have stated, this calcium phosphate—take any given bed of this calcium phosphate, that it has a very great uniformity of value? A. In particular bodies?

Q. Yes.

A. As far as my observation has extended, that is so—of course none very deep—none of the observations go deep.

Q. I am asking you as far as you know.

A. Yes, sir.

Q. That is not true of the ordinary vein, is it?

A. Well, it depends on the character of the vein. Now, there are big low grade bodies of copper ore that extend in uniform value for long distances.

Q. For how long? A. And iron ore too.

Q. How long in copper?

A. Well, I was speaking of that one which I mentioned before.

(Testimony of Guy Sterling.)

Q. That is on the dip?

A. Yes—oh, you mean on the strike?

Q. Yes.

A. Well. I don't think I have ever seen any deposit of any ore exposed on the strike for such great distances as it is in these beds of phosphate rock.

Q. Now, as a matter of fact, there is not any such a vein known, is there, in the history of mining, that extends like this does, so far as your knowledge goes? A. Not with the continuity of it.

Q. Isn't it also true, Mr. Sterling, that veins do not conform to the stratification planes of the rock in which they are found?

A. Not always. **[406]**

Q. Well, generally?

A. It depends upon the character of the formation and character of the vein, where it is. I don't think that a man would be right in saying that was the rule or not the rule.

Q. Isn't it true where it does follow the stratification planes that it is only for short distances, comparatively short distances, and then, it breaks through the different strata?

A. I have heard of that occurring.

Q. Isn't that true, from your examination of veins? A. Not absolutely.

Q. Not absolutely, but generally.

A. It is sometimes true, and sometimes is not. I know of deposits that—

Q. Answer my question.

A. I can't say whether the universal rule.

(Testimony of Guy Sterling.)

Mr. DEY.—He is answering it.

Mr. BUDGE.—He is not answering it at all. I asked him whether that was not generally true, and he says not universally true.

A. I will say it is not generally true, then.

Q. That is what I want to get. If you will answer my questions we will get along faster. Now, would you say it is generally true that veins, as a vein is commonly understood, do follow the stratification planes of the rock in which they are found?

A. I would not be able to say that there is any common understanding about that. [407]

Q. I am not asking you for any common understanding.

A. I thought you asked me if it was commonly understood.

Q. What do you understand—

Mr. DEY.—That is just exactly what you did ask him.

Mr. BUDGE.—I beg your pardon, if that is the question.

A. Why, I understand a vein may, and I know that they actually do exist both in conformity with the stratification, and in intersection with it.

Q. And in which form do they most often occur?

A. We will take it over at—

Q. No, take it altogether.

Mr. DEY.—I object to that as immaterial to any issue in this case.

Q. Taking it altogether in mining—I am not asking you about Bingham.

(Testimony of Guy Sterling.)

A. I have to give you my personal experience.

Q. From your personal experience what do you gather as a conclusion as to the whole proposition, the whole country?

A. All right; you want to know my general conclusion from my experience in Utah here, which is that there are probably just as many deposits here on the bedding planes as there are on fissures that cut across.

Q. That is to say, that your experience is to the effect that ore deposits, which are commonly known as veins, within the State of Utah as often follow and conform to the stratification planes of the rock in which they are found, as they intersect?

A. Yes, sir; that is my experience.

Q. In these veins where the stratification is followed, is it followed in the manner that this deposit, that the calcium [408] phosphate appears in this deposit?

A. The ones that I speak of, yes. They are right on the beds between sedimentary formation.

Q. Just as well defined as this, so far as the stratification planes are concerned? A. Frequently.

Q. Those that I am talking about, all of them?

A. Not all of them; they vary. Some are in lenses, and some will run in even beds along the stratification planes.

Q. For what distance?

A. Of course, none of these mines I speak of have been developed to any great extent. The maximum I think would be a thousand feet deep.

(Testimony of Guy Sterling.)

Q. On the strike, are you talking about?

A. Oh, on the strike—well, none of them, I know, would be any more that three or four claims long.

Q. Well, what about the workings?

A. That is the exposure on top, three or four claims long. The workings, as I have said, none of them are a thousand feet deep. Most of it is not over three or four hundred feet deep; the most of them would have a maximum of thirteen to fifteen hundred feet of drifts and workings on the vein.

Q. And in these deposits concerning which you have testified, and which you say are as great and as many in number as the deposits that intersect the strata, the ore body follows the stratification just as clearly and as distinctly as this calcium phosphate follows the stratification plane?

A. Yes, sir; that has been my personal experience.

[409]

Q. Isn't it true, Mr. Sterling, that veins are in igneous rock?

A. Certainly so, but not all of them, though.

Q. Most of them?

A. I don't think you can say that, in the sense that the vast majority of them are.

Q. You would not say a vast majority, but you say most of them?

A. I suppose you mean by that vast majority.

Q. Well, what do you say?

A. Well, I would say, as I said before, my experience in Utah is that most of the deposits here in this country have walls of sedimentary rock.

(Testimony of Guy Sterling.)

Q. Of sedimentary rock. Didn't you say—State-line is not among that number?

A. No; that is an igneous formation entirely.

Q. What about Ophir?

A. At Ophir the ore occurs over there in the bedding-planes of the limestone.

Q. And in Tintic?

A. In Tintic it is irregular; sometimes it is on the bedding-planes, and sometimes cutting across it.

Q. Any in igneous rock?

A. There is in a part of the district, and part of the district there is not.

Q. A part there is and a part there is not. What about the Bingham country?

A. Well, there is both igneous rock over there and sedimentary, and a good deal of the ore over there that I am acquainted with, occurs on the bedding-planes in the sedimentary formation.

Q. Do the veins in the igneous rock follow any bedding-planes? **[410]**

A. Well, as a rule igneous rocks have no bedding-planes.

Q. Have you read Bulletin No. 436, by George H. Girty? A. No; I have never seen that before.

Q. Did you ever hear of any fauna in veins and vein deposits, as the word vein is commonly understood?

A. I have heard of fossils, that is fossils in which the material had been replaced by metal and mineral in veins.

Q. Have you ever heard of what is known as an

(Testimony of Guy Sterling.)

ore body in veins, or a vein or ore body containing fauna?

A. I think that I have heard of that occurring where fossils—or the shape of the fossils had been found in bodies of ore.

Q. Now, that does not answer the question.

A. I think it does.

Q. I didn't ask you about the shape of the fossils at all.

A. Well, it would be a fossil, although it would be replaced by something else. The material there would be different from what the fossil was in the first place.

Q. The impression of the animal is what you mean? A. Or shell.

Q. Or something of that sort? A. Yes, sir.

Q. Now, you say you have heard of it?

A. Yes, sir.

Q. Where?

A. I can't remember distinctly, but I have heard of it.

Q. Now, then, as a matter of fact fauna does not occur in vein deposits, does it?

A. Yes; it might be a part of the wall that was left, in the vein after the *wall eaten* away; it would be in the vein and in the deposit. **[411]**

Q. Now, where does that occur?

A. I say I don't remember, but I remember distinctly of hearing of it, although I don't remember where it was I saw that, or heard of it.

Q. You don't know where you read of it, or any-

(Testimony of Guy Sterling.)

thing about it?

A. No. It was in some geology I read it, undoubtedly.

Q. And you don't know where it was stated that those conditions obtained?

A. No; I don't remember that now.

Q. They do not obtain in Utah, do they, so far as your information goes?

A. I don't remember anything of that kind in Utah.

Q. And you have never heard of any particular place in this western country where there was fauna in any vein deposit, have you?

A. I think that I have heard of it, of fossils that had been replaced by mineral and metal being found in the silver mines at Silver Reef Mine in Utah.

Q. You mean the Silver Reef Mine?

A. Yes, sir.

Q. Down there at St. George? A. Yes, sir.

Q. Is that the only place?

A. That is the only place I remember of in Utah.

Q. Are you positive of the fact that there is fauna there?

A. Yes, sir; I think there have been both fossils, leaves and twigs in the shape—or metal in the shape of leaves and twigs have been found in those mines there.

Q. As a matter of fact, that is not strictly a vein ordinarily, as veins are commonly understood. In fact, that is an exception, that deposit, in the nature of its formation?

(Testimony of Guy Sterling.)

A. If you ask me if a vein all I can say is that it is located [412] as a lode, and considered by the miners as a vein.

Q. Is it a fissure vein?

A. I would not quite say fissure vein; it is a vein, though.

Q. It is exceptional in the nature of its formation, isn't it?

A. Well, I am not familiar enough with that to say. It may apply.

Q. Have you ever seen it?

A. No; I never have.

Q. Do you know of any other place?

A. In Utah?

Q. Yes; or in the west.

A. I don't remember any now.

Q. Remember any place anywhere?

A. I don't remember any place in particular.

Q. Or in general?

A. No, nor in general, not any more than I have already stated.

Q. Now, these beds of calcium phosphate belong to a certain geological age, don't they?

A. They must.

Q. In the Upper Carboniferous age; isn't that correct? A. They must, of course.

Q. Isn't that true? A. I presume it is.

Q. That is the accepted theory of geologists, isn't it? A. Yes, sir.

Q. And vein deposits, as they are commonly understood, do not belong to any given age, do they?

(Testimony of Guy Sterling.)

A. Not necessarily.

Q. They usually occupy, as veins are actually understood, fractured zones, don't they?

A. Well, no, not necessarily; they do and they do not. It depends upon the conditions that happened to exist there at that particular point.

Q. Is not that one of the peculiarities or characteristics [413] of veins?

A. It is a characteristic; it is not a general characacteristic.

Q. Well, it is true also that veins are usually found in igneous rock?

A. Well, that, as I stated a little while ago, I would not say that they are found in one any more than in the other, in my experience in Utah.

Q. From your knowledge as a geologist, what do you say?

A. I would say the same thing. I would say that if you examined the whole field very carefully you would find probably as many deposits here occurring in the sedimentary rock as they do in igneous rock.

Q. Your answer to the question then, as a geologist, would be that veins are not usually found in igneous rock?

A. No. I say just the contrary. I say they are found there, and they are found in sedimentary rock too.

Q. Now, how do you distinguish a placer?

A. I have forgotten how I did define it.

Q. How do you define it now?

A. You mean now? I will ask you to be a little

(Testimony of Guy Sterling.)

more explicit. Do you want me to define what my idea is of all ground that is practically locateable as a placer?

Q. I want you to tell me what a placer deposit is, to define what you consider to be a placer deposit.

A. Well, in the original meaning of the word it is a secondary deposit, in a late geological age, of material by water.

Q. A deposit by water?

A. In other words, an alluvial deposit. [414]

Q. A deposit by water, you say?

A. Yes, sir; carried from some distance and deposited by water, and perhaps in water, but not necessarily.

Q. Now, in that respect, so far as that particular element of the definition is concerned, this deposit of calcium phosphate, if it were horizontal, would meet that requirement, would it not?

A. It would meet it to that extent.

Q. So far as that element is concerned?

A. Merely to that extent.

Q. So far as that element is concerned it would meet it if in a horizontal position. As a matter of fact, a placer is every kind of a deposit which is not a lode, or which is not a deposit such as is taken up under one of the modifications of the placer law?

A. Now, you are speaking of the law—I think that is right.

Q. It has a very broad signification in that respect?

A. Yes, sir; because it is applied to salt, quarries and to a number of special deposits.

(Testimony of Guy Sterling.)

Q. Now, when you speak of this calcium phosphate being in place, a horizontal deposit is in place, isn't it?

A. To use the word "in place" in its legal significance, I would say a horizontal deposit was in place if it was the original place in which deposited, had never been moved from some other place to that place of deposit.

Q. Isn't it true that these lode formations that are known and accepted to be lode formations, have been moved into their present position by convulsions of the earth? [415] A. I think not.

Q. Is not that the geological theory of it?

A. No; I never heard that they was moved there by convulsions of the earth.

Q. Well, what condition then, eruptions?

A. Generally, one way at least, and a very common way, and really it is a theory accounting for the deposition of mineral in a vein, is that it has been brought there by either hot or cold water, and through chemical reactions deposited there.

Q. Yes; but so far as rock in place is concerned, and talking about rock in place, you have stated horizontal rock would be considered in place, if it had never been moved, have you not? A. Yes, sir.

Q. And therefore a lode rock which has been moved by some eruption, and which came into its present form by eruption, under your definition, could not be a lode, and could not be in place because it had been moved?

A. Not in the sense that I spoke of, because it is

(Testimony of Guy Sterling.)

in the vein; it is in the form of a rock, although it may be ore.

Q. I am not talking about ore; I am talking about rock in place.

A. All right; we will call rock ore or ore rock.

Q. I say if it is in place in the vein, that is the place in which the elements and material in which that is found combined in the form of rock or ore; and if it was moved from there afterwards by eroding effect of water, or some other cause like that, and deposited in another place, I would say [416] in the other place it was a placer.

Q. You drift off into a placer, but I am not asking you about a placer, Mr. Sterling. I am trying to get your idea of what rock in place is.

A. Well, before it is moved from the fissure vein and after it had become rock or ore in the vein, I would say it was in place.

Q. Now, then, if there came some internal force that should twist or create in that rock a fault, by reason of that movement it could not be in place then, simply because it had been moved?

A. It might be in place between its walls, although it would not be in the exact spot on the earth in which it was originally deposited.

Q. Would it be rock in place?

A. Yes, sir; if it was between walls.

Q. So that if a horizontal deposit is moved, it would be in place after the movement, just the same as this deposit would be in place after movement, would it not? A. Yes, sir.

(Testimony of Guy Sterling.)

Q. Certainly. A. Yes.

Q. Did you ascertain the dates when you made these reports?

A. I find I made this Lorine report, as I stated before, at least the date I turned it in to the Surveyor General was about the 19th of May, 1908.

Q. You had the interest in these claims in 1906, at that time, did you say?

A. No; I did not say that. I say I began my examination and work on the Bradley claims in 1906. [417]

Q. When was it you made the survey for this man?

A. Crownholm?

Q. Yes.

A. I surveyed these claims for him on the 28th or 29th day of September, 1907, but I had no interest in them when I surveyed them for him.

Q. Did you have an interest in them subsequently?

A. I got the interest in them subsequently, subsequent to this report.

Q. You are positive that the time you acquired the interest in these claims was subsequent to this survey of the claims?

A. Subsequent to the time I surveyed for Mr. Crownhold.

Q. Subsequent to the filing of this report did you obtain your interest in these claims?

A. Subsequent to the filing of that report?

Q. Yes.

A. No; I am not positive about that, but I think I became interested in this before that report was filed;

(Testimony of Guy Sterling.)

I am not absolutely sure, though.

Q. That is the best of your judgment?

A. I am not absolutely sure, because I went up and down in that country so many times.

Q. Is there any way that you could determine that?

A. Yes, sir; I can determine it absolutely.

Q. Can you do it from any data that you have at hand at this time, so that we could tell?

A. I believe Mr. Jack may have something here that would throw some light on it.

Mr. BUDGE.—I would like to know, Mr. Jack, if you can ascertain that.

(Mr. Jack hands paper to witness.)

A. Yes; I am satisfied I had an interest in these claims before—let us see, March—well, it amounts to that, that [418] I became interested, at least potentially, in those claims about the time I filed that report?

Q. And before it was filed?

A. You may call it a little before, that I was interested potentially, because I expected to be interested in them.

Q. Can you tell me whether or not you had an interest, or possessed an interest, whether potential or not, before the report was filed?

A. I can't tell you absolutely, because it is necessary, I imagine from what you say, to be very exact about it. I know that I made these examinations and came to the conclusions in that report long before I had an interest in the claim, but at the time I filed the report, as I said there, I was interested in it, or

(Testimony of Guy Sterling.)
expected to be very shortly afterwards.

Q. And it may be the fact, so far as you now recollect, that at the time the report was filed you did possess this interest?

A. It may possibly be, in some of them.

Q. Had you that—

A. It was not in my name, but I say I expected to purchase an interest in them.

Q. And did, as a matter of fact, thereafter, if not before the report was filed?

A. Yes; if you want to show that I was interested in this ground, it is just the same; I expected to be interested in it.

Q. You regard it just the same?

A. I regarded it just the same; I expected to be interested in it. [419]

Q. Now, then, how long did you hold these claims, Mr. Sterling, the interest which you had?

A. I held it a little while, and then I think they were practically abandoned and then taken up again.

Q. Did you take them up again?

A. No; Thure Crownholm took them up for Frank Stephens and then I purchased an interest of them and they held it—we held it altogether about probably six or seven months, and sold it.

Q. Do you care to state to whom you made this conveyance?

A. It was made—we made our conveyance in the first place to the Union Phosphate Company, I think; that is, we sold them a part interest in the ground.

Q. Who did you sell to afterwards?

A. Then, we sold our interest afterwards to

(Testimony of Guy Sterling.)

Duffield and Jeffs.

Mr. DEY.—In the matter of the testimony of Mr. Charles Hoff, we do not want to keep him here to read and sign his deposition; will you waive that?

Mr. BUDGE.—Yes; and I was about to ask you to waive the reading by and the signatures of all of our witnesses to their depositions respectively, to be taken by Mr. Hamer in Pocatello, and we will agree to do the same as to all your witnesses.

Mr. DEY.—Yes; we will agree to that.

Q. Mr. Sterling, did you, in the examination of this Crawford Mountain here, and in the area covered by the Japan and China [420] lode claims and the Fryerson lode claim, the Montpelier group of claims, as shown on Exhibit 1, discover within the boundaries of any of those claims, or in proximity of any of those claims, close proximity, any deposit of any igneous rock? A. No; I think not.

Q. In other words, that section of country is not and does not contain igneous rock formation?

A. I have not seen anything of that kind. Once or twice I thought I saw some, but I decided afterwards there was not any.

Q. Now, one more question, and I think I am through. I will ask you whether or not you stated in your report that this deposit of calcium phosphate extends from some given point in one direction two miles, and in another direction approximately ten miles?

A. I think I stated that with reference to the Lorine lode.

Q. Well, it is practically, is it not, the same forma-

(Testimony of Guy Sterling.)

tion as this anyhow?

A. Yes, sir; it is a part of it.

Q. That is what I say. And what would you say as to the general extent along what you call the strike of this deposit in which these claims are all situated?

A. I have stated in my direct testimony, I think, that I thought it was about ninety miles approximately from the Obey lode to the southern end of the deposit, in the Crawford Mountains; that is about as far along what we call the strike of the deposit as I have been.

Q. Now, calling your attention to your examination of these [421] claims when you were over there with Mr. Wilson, you have stated in one place you had discovered some strippings on the top of the deposit, some 800 feet in extent. Where is that?

A. That is in the northerly part of the Obey lode, and shown on Exhibit No. 1.

Q. The northern part or southern part?

A. The Obed lode is on Exhibit No. 1.

Q. Yes; in the Obed lode, and within what is shown up here as the Inman and Winfield placers?

A. Yes, sir.

Q. Now, there is another point which was 300 feet. Where was that?

A. I think that was here on the Wayne lode; that was my guess of the distance—well, there was some also in the Obey lode, I think I mentioned.

Q. What extent was that that you mentioned?

A. Well, I guessed at it.

Q. Just a guess?

A. Just guessed the distance. We did not measure

(Testimony of Guy Sterling.)

the distance. I will give you just what I guessed it at. I have got it here from the tunnel No. 4 to the Obey discovery as about 450 feet of the lower part of the phosphate series that is stripped, and the outcrop of the phosphate rock in place is clearly shown in the stripped ground.

Q. Now, when you speak of the vein of calcium phosphate, you refer, do you not, to the lower bed of phosphate rock next to the calcium carbonate deposit?

A. When I speak of the vein I generally speak of it meaning the vein of phosphate rock that is exposed; or if it is more than one vein I mean those two veins, and it may be [422] either at the top of the series or at the bottom of the series; it depends entirely on where it happens to be exposed.

Q. Do you call the deposit, the entire deposit between the chert, the overlying chert and the calcium carbonate, as the vein between the chert, overlying chert and the calcium carbonate?

A. Do I call it what, please?

Q. A vein?

A. No; I call that, as I understand you, I call everything between the hanging-wall of the series and the footwall of the series, the series of alternating beds of phosphate rock, and each one of those beds is bounded by what I have spoken of in general as limestone.

Q. And each one of those beds has its walls defined? A. Yes, sir.

Q. Just the same as the series has well-defined walls of chert and calcium carbonate?

(Testimony of Guy Sterling.)

A. Yes, sir.

Q. But do you know whether there is more than one deposit of calcium phosphate that is commercially valuable? A. More than one bed?

Q. Yes; more than one bed. A. Yes, I saw—

Q. I mean on the Montpelier group.

A. I would not undertake to say definitely about that; I think in one—I have the impression, and that is all it is—that there were exposures—no, I don't think that was on the Montpelier group; I don't think that I saw more than one, what appeared to be a bed of phosphate rock, which was of commercial value, but I would not say that there were not any more. That is all I remember of seeing. **[423]**

Q. That is what I am asking you for, from your own observation only one?

A. Yes, sir; that is all I remember.

Q. Therefore the other beds of phosphate rock would not be termed ore bodies?

A. Not if that was the only one; I would not call anything that has no commercial value an ore body.

Q. So that the ore body in this particular series on the Montpelier group at least is simply the lower bed?

A. Well, it might be—I don't say it is so, because my examination did not go deep enough for that.

Q. I am asking you simply to state, and I don't want anything else, but simply what you know from your own observation.

A. Well, from my own observation, as I say, I don't remember of seeing in any place more than one bed that appeared or looked to be ore, but I will look

(Testimony of Guy Sterling.)

through my notes so as to be sure about that. I won't say positively, but I am quite sure, at least I don't remember of seeing any more than one vein of what appeared to be phosphate rock, that was exposed, and some of those were 5 to 6 feet, and some I have got noted here were 7 feet thick.

Q. So that what you term to be the walls of the ore body in these claims, on these claims, are of calcium carbonate at the bottom, and shale or sandstone at the top?

A. Well, in this particular examination I think that generally both walls of the bed of phosphate rock was limestone, although sometimes it was shale and soft.

Q. I am talking about the lower beds.

A. Of the series? [424]

Q. Yes.

A. Well, that, as I remember it, was a rather silicious limestone, a cherty limestone, the hanging-wall of the series, or what I call the series—I mean the footwall, what I call the footwall of the series.

Q. What is it of the hanging-wall?

A. The hanging-wall of the series?

Q. No; I mean the lower bed of the phosphate rock.

A. I have got it stated in my notes, and as I remember it it was generally what I considered limestone, although sometimes it was shale.

Q. Well, did the deposit of silicious limestone 3 or 4 feet in thickness—

A. Now, you are speaking, of course, of this group that belongs to the Lorine, a different proposition.

(Testimony of Guy Sterling.)

Q. A different proposition?

A. Different conditions exist.

Q. Then, tell me what it is here—let me shorten lt—at Montpelier, what you termed the hanging-wall and footwall, of what you say is the only commercially valuable deposit of the series, is calcium carbonate?

A. I said it was the only valuable, commercially valuable deposit of the series that was exposed.

Q. That you saw? A. That I saw.

Q. That is what I mean.

A. I see that the walls of that were what I call limestone, although it might have been very silicious, and may have been shaly.

Q. It was more silicious at the bottom, and not so silicious at the top. Is not that the fact?

A. I would not say about that definitely. **[425]**

Q. Now, you have spoken about the outcrop of this calcium phosphate along this deposit as the apex. Now, what do you mean by apex?

A. The outcrop of the vein on the surface of the earth.

Q. Is that the definition of the word apex, that it is the outcrop?

A. That is the definition, as I understand it, where the vein comes to the surface.

Q. Is not the apex commonly understood now as being the highest point on the claim? A. No.

Q. The highest point where the outcrop is?

A. No; I don't understand it to be the highest point on the claim. It might have been an outcrop down in the bottom of the gulch, and another outcrop

(Testimony of Guy Sterling.)

on the mountain, away up in the air, and still both points would be on the apex of the vein, as I understand it.

Q. That is your understanding of apex?

A. Yes, sir.

Q. Do you know of any vein of what is commonly known as—any lode or vein, commonly understood and accepted as a lode or vein, to have an apex like what you term here to be an apex, for the extent that this has?

A. No; I don't know of anything that has such a large or long exposure of apex, but I know of a great many exposures of the apex that are similar in every other respect.

Q. Have you ever visited the deposits at Georgetown, north of Montpelier, about twelve or fifteen miles? A. No; I don't think I went there.

Q. You have never seen those?

A. No; I am sure I did not go there. This was all, this trip to the Crawford Mountains that I had anything to do with, with those gentlemen. [426]

Mr. BUDGE.—I think that is all.

Redirect Examination.

(By Mr. DEY.)

Q. When you referred to this section of the deposit that was of commercial value, had you reference to the present condition as to mining, transportation and treatment?

Mr. BUDGE.—We object to that as leading.

A. Yes, more particularly, although—

Q. What do you mean?

(Testimony of Guy Sterling.)

A. Although I had a little broader idea than that, such rock as might, within a reasonable length of time, become commercially valuable.

Q. You also took that into consideration, did you?

A. Yes, sir.

Q. What do you mean by a reasonable length of time? A. Well, say ten or twelve years from now.

Q. What do you know about what will be the conditions then?

A. I don't know; it is just a matter of judgment.

Q. How did you come to make the report on the Bradley claim, that you have testified to upon cross-examination?

A. I was employed by the Bradleys, I think in 1906, to survey their claims for patent, and at that time they explained the situation to me, and asked me whether I thought they ought to be located as placers or lodes; and they explained to me that there was some controversy among the people in that country as to how they should be located; and they also told me in regard to the controversy over the Waterloo placer; and after getting their description of the formation, and going on the ground, I told them that I thought they ought to be [427] located and carried to patent as lode claims, and subsequently I surveyed them for the Bradleys for patent, and they went in the course of time to the Land Office in Washington to be patented, and when they came to this last stage I think the Union Phosphate Company and the San Francisco Chemical Company both protested against them being patented as lode claims, and the Department of the Interior asked me for

(Testimony of Guy Sterling.)

those reports in order to give them information upon which they could decide whether or not they could be patented as lode claims; and I simply wanted to call attention to the fact that my opinion in regard to how those claims should be located was formed independently and long before I had any intention of being interested in any claims whatever.

Q. And before you had any interest?

A. Before I had any interest, or intention or expectation of having an interest.

Cross-examination.

(By Mr. BUDGE.)

Q. But nevertheless, as you have stated, the report which you made was, according to your best recollection, filed after you had become interested?

A. Either after I had become or after I expected to become, which is all the same.

Q. It is all the same.

A. As to any influence it had upon my mind as to the formation of my opinion, as my opinion was formed long before that. [428]

And thereupon the further taking of the depositions and testimony in this cause was, by consent of said parties, by their respective solicitors and counsel, adjourned, to be resumed on Saturday morning, the 20th day of May, 1911, at the hour of 10 o'clock.

Saturday, May 20, 1911, 10 A. M.

At this day come again said complainants, by Messrs. C. B. Jack and Charles C. Dey, their solicitors and counsel, and the said defendant, by Jesse R. S. Budge, its solicitor and counsel, also comes; and

(Testimony of Guy Sterling.)

thereupon the further taking of the depositions on the part of said complainants in this cause is resumed, pursuant to adjournment.

[Testimony of Guy Sterling, for Complainants (Recalled).]

GUY STERLING, a witness produced by the said complainants, heretofore duly sworn, being recalled, further testified:

Cross-examination.

(By Mr. BUDGE.)

Q. Mr. Sterling, I will call your attention again to the report which you stated you made to the Government. I will ask you **[429]** whether or not, at the time you filed this report, you notified the Government, or called to their attention the fact that you were interested in these lode claims?

A. No; because I did not own any interest in it at that time, and the interest that I did finally acquire was purchased.

Q. Well, you said, did you not, that you were not positive whether you did own it at that time or not?

A. I said I did potentially—that is, I expected to become interested in it, and so far as any influence which my interest would have in the thing, it was just the same as though I actually owned it, but it had none at all.

Q. Did you notify the Government that you were potentially interested? A. No, sir.

Q. You did not call that to their attention at all?

A. No; I will state furthermore that what they called on me for was merely a statement of facts,

(Testimony of Guy Sterling.)

and this was merely a statement of facts, except in regard to the theory of the deposition of the phosporus, and there was no conclusions on my part at all.

Q. The report which you made the Government has been printed, Mr. Sterling, as a Government report?

A. No; not any further than you see in the hearings.

Q. You mean in the hearings on phosphate lands before the Committee on Public Lands in December, January and February, 1909, wherein the bill of Mr. Mondell was up for consideration, as to the manner of giving these lands to claimants by lode or placer patents?

A. I believe that was it; it was introduced by the Bradley Brothers' lawyer, their attorney, who was at that [430] hearing, Mr. Payson.

Q. Payson?

A. Payson; yes, sir; it was introduced by him; it was not introduced by the Government. It was introduced by him, as I understand it.

Q. That is correct. You are right about that. It was introduced by Mr. Payson. A. Yes, sir.

Q. Now, these reports which you have stated you have read on phosphate, the Gale and Richards reports and the Weeks and Ferrier reports, which I understood you to say were the only reports that you can remember of having read, were Government reports? A. Yes, sir.

Q. They are both published by the Government?

(Testimony of Guy Sterling.)

A. Yes, sir.

Q. And in both of those reports, Gale and Richards, and the Weeks and Ferrier reports, the conclusion reached by the geologists making those reports was that those claims were properly locateable as placer?

A. Now, I don't pretend to be familiar with those reports at all, but the impression I got from those reports is that they thought, the author appeared to think,—that owing to the extralateral rights which go with lode claims, that if these claims were located under the lode law they granted too much right, and furthermore, that they were not strictly placer claims, and the claims of lands ought to be located under some special law. That was the impression I got from those reports.

Q. Don't you recall that they came to the conclusion that as the [431] law now stood, inasmuch as there was no special act under which this could be done, that a placer was the more proper way of taking them?

A. I did not get that impression, no; and even if they did come to that conclusion, I am perfectly willing to acknowledge it, because it would not make any difference; it was a mere matter of opinion, anyway.

Q. Let me call your attention to Gale & Richards' report, at page 78. A. Yes.

Q. This, as I say, on page 79, is as you state, is it not, that they conclude that they are not properly veins or lodes, or typical placers, either one?

Mr. DEY.—We object to this as not proper cross-

(Testimony of Guy Sterling.)

examination, and also as wholly immaterial, incompetent and improper, to examine the witness on some ex parte opinion of Gale and Richards.

Now, if there is no objection, I would like to read the sentence I had in view in answering your question.

Mr. DEY.—If anyone wants it I don't care. I don't want it.

A. There is only one sentence I wanted to read, the one I had in view in the answer to Mr. Budge's question.

Mr. DEY.—Make any explanation you see fit.

A. It says, "Under the strict interpretation of the present law, and with the recognition of the true character of the western deposits, it may be held in the courts that they must be considered as covered by the lode law. It is to be [432] hoped, however, that further patents in these western fields may be withheld until equitable adjustment of the existing difficulties can be provided."

Q. (By Mr. BUDGE.) Where is that?

A. That is the last sentence on page 80, in the paragraph headed, "Title Granted in Western Phosphate Fields," the last two sentences in that paragraph.

Q. Now, to make the explanation complete, Mr. Sterling, just read the entire paragraph there.

A. I have.

Q. That is one paragraph at the top of the page.

A. Page 80, under the heading, "Title Granted in Western Phosphate Fields.

(Testimony of Guy Sterling.)

"Title has passed in two cases in the western phosphate fields, the Waterloo claim at Montpelier, Idaho, and the Bradley group of claims in the Crawford Mountains, Utah. The Waterloo patent was granted as a placer, and the Bradley claims were later allowed to patent as lodes. As previously stated, prior to the granting of the Waterloo patent, all entries for phosphate lands were made in the Florida fields, and presumably covered deposits of true placer type, but it appears that the distinction between these deposits and the phosphate beds of the western field was, perhaps, not clearly brought out at that time. Under a strict interpretation of the present law, and with the recognition of the true character of the western deposits, it may be held in the courts that they must be considered as covered by the lode law. It is to be hoped, however, that further patents in these western fields may be withheld until an equitable adjustment of the existing difficulties can be provided." [433]

Q. As you have further stated—

Mr. BUDGE.—Did your objection run to this first question which was propounded?

Mr. DEY.—It ran to the examination concerning Gale and Richards' opinion.

Q. And as stated, one of the reasons why the geologists have concluded that a lode was not the proper form of location of extralateral rights?

A. Well, this is what he gives here as his objection.

Q. Well, that, as I say, is one of the objections

(Testimony of Guy Sterling.)

still. Now, have you read the report of F. B. Weeks?

A. Yes, sir; that is the one I have.

Q. This one by him alone?

A. I don't think I have read that, Mr. Budge.

Q. Known as Bulletin 340–K, 1907. Now, one more question, Mr. Sterling. In relation to this, where calcium oxide is used as a fertilizer.

A. Calcium oxide?

Q. Did you not testify yesterday that it was used commercially?

A. I have testified yesterday that calcium sulphate was used as a fertilizer; you may call it—

Q. Well, that is commonly called gypsum?

A. Yes, sir.

Q. But I am talking about calcium oxide. Calcium oxide is used as a fertilizer, I mean the rock alone? A. Limestone is, yes.

Q. Slack lime?

A. Yes, sir; I suppose slack lime might be used too.

Q. Now, then, that is used for the benefit which will accrue to the land from the action of the calcium on the land? **[434]**

A. Well, I must state that I do not—I am not absolutely sure that I know of any calcium oxide. You mean hydrate of calcium?

Q. Well, it is slack lime.

A. Well, I don't think it is proper to call it calcium oxide.

Q. If that is not the proper term for it, and if I

(Testimony of Guy Sterling.)

have given it wrong, answer as to, whatever it is.

A. Slack lime might be used just exactly as limestone is used, to sort of neutralize the—

Q. Alkali?

A. No, sir—well, it might be used to neutralize some of the acids to correct any acidity there might be in the soil.

Q. And as a matter of fact, it is the calcium in it that has that effect?

A. Well, calcium with an earthen alkali, and sometimes with some other alkalies, will make a chemical combination and have a decomposing effect.

Q. When slack lime is used for the purposes stated, isn't it true that it is for the purpose of sweetening the land, so to speak?

A. That is why it would be used to neutralize the acidity.

Q. And therefore it is the calcium in it that has that effect, hasn't it? A. Yes, sir; partly.

Q. And the calcium phosphate would have a like effect, would it not?

A. Why, I don't know, I must say, whether calcium phosphate could be broken up by any other alkali; it might have that effect.

Q. I am speaking about calcium phosphate, as it is used as a fertilizer. Would not the calcium unite and operate [435] to a degree in the same way that the calcium in this line would operate?

A. As I say, I don't know; I don't think so.

Q. Why do you say you do not think so?

A. Because calcium hydrate, that which is a com-

(Testimony of Guy Sterling.)

bination of hydrogen and oxygen and calcium, would act upon, for instance, some of the sodium salts, or potassium salts, or with some weak organic acid, where calcium phosphate would not be effective.

Q. Do you mean to say that this calcium that is in the calcium phosphate would be of no benefit whatever upon the land?

A. Not in the sense that—

Q. Would it in any sense?

A. It would be so very slow—it is so insoluble under ordinary conditions that for any practical effect I would consider it useless.

Q. But after the treatment?

A. After the treatment, that is another matter.

Q. Well, then, after the treatment, as you have explained the treatment, as I understand it, after the treatment has been given to the calcium phosphate rock, then, would not the calcium in that rock have a beneficial effect as a fertilizing element on the land? A. After the treatment?

Q. That is what I say.

A. The calcium—

Q. Can't you answer that yes or no?

A. I am going to. After the treatment the calcium phosphate is changed into different forms of calcium phosphate, some of which is soluble, and a part of the calcium is changed into calcium sulphate, that is gypsum, by this treatment, [436] and that, of course, the gypsum so far as it extends, would have just the same effect there as if it was applied raw.

(Testimony of Guy Sterling.)

Q. How about the balance of the calcium that is not changed to a sulphate?

A. It is still in combination with the phosphoric acid, and it is in soluble shape. My opinion would be it would not have this neutralizing effect, because they are acid calcium phosphates.

Q. And it is your information, and do you state positively, that this treatment changed this calcium into calcium sulphate? A. Part of it.

Q. Did you analyze it?

A. I know it from the chemical formula.

Q. You know it from the chemical formula?

A. Yes, sir.

Q. And that this calcium in this rock, after its treatment, has no effect upon land at all beneficially?

A. I did not say that at all. I said it has no neutralizing effect.

Q. I am not asking about neutralizing effect. I am asking if it has any beneficial effect, and you will not answer my question.

A. I say I doubt whether calcium itself, except that which is changed into gypsum, has any beneficial effect.

Q. Would you say that any portion of it would have any beneficial effect?

A. The part changed into gypsum would have some beneficial effect.

Q. What proportion is that? You don't know?

A. Yes.

Q. What proportion?

(Testimony of Guy Sterling.)

A. Why, I can tell it by referring to a work on chemistry.

Q. Well, state your opinion without such reference.

A. I say there is a lot of formula which would be useless [437] for anybody to attempt to remember.

Q. I did not ask you that. I asked you if you know what proportion of a given quantity of sulphate or calicum phosphate would be changed to gypsum. Can you tell?

A. Yes, sir; I think I can.

Q. Approximately?

A. I think I can tell you; I think it is about one-third of the calcium in the calcium phosphate, presuming it to be the pure calcium phosphate and uniform.

Q. No; I am asking about this rock; that is what I am asking you.

A. Presuming that rock is pure calcium phosphate—

Q. Not presuming that, but what it is.

A. It has different grades.

Q. Take the grade that is here then.

A. I don't know without an analysis of some particular piece of rock, how much calcium phosphate there is in it.

Q. Take the analysis of these samples concerning which you have testified; consider those samples. How much in quantity of that rock?

A. I have here before me, which I am using merely

(Testimony of Guy Sterling.)

for the purposes of illustration, the analysis of a piece of calcium phosphate taken from the Shoshone claim in the Bradley group.

Q. Have you got none here?

A. I have not a complete analysis of any of these. They simply give the calcium phosphate—this gives the whole thing, all the ingredients of the rock, and undoubtedly there are a great many other pieces just like this in the whole country. This is just merely used for illustration. [438]

Q. Go ahead and let us have it.

A. This happens to be a high-grade piece of rock. It carried 81 per cent of calcium phosphate, and 11 per cent of carbonate of lime, and then there was a little magnesia, a little iron, and a small amount of insoluble material Now, my opinion would be, when that was treated with sulphuric acid, that one-third of the calcium in the 81 per cent which goes to make up the calcium phosphate in this sample, would be changed into gypsum, and that all of this 11 per cent of calcium carbonate would be changed into gypsum.

Q. So you would have there, in the 100 per cent of this rock, 27 plus 11, equalling 38, approximately, per cent of that rock which would be changed into gypsum, which would have some beneficial effect?

A. It would have, as I have before stated, a mechanical and perhaps a chemical beneficial effect upon the soil.

Q. Now, the other rock from any other portion of these claims which are in question in this contro-

(Testimony of Guy Sterling.)

versy, would have the same proportionate benefit, considering the quality of rock, that this would have?

A. If they have the same proportion of ingredients it would be just the same, but we have to keep in mind all the while that it requires that chemical treatment to bring about that condition.

Q. What is that you say?

A. We have to keep in mind all the while that it requires that chemical treatment to bring about that condition.

Q. Don't you know, Mr. Sterling, that this phosphate rock in [439] this particular rock perhaps out of these claims, and phosphate rock such as this is, is used in its natural condition just as it is taken out of the ground?

A. I don't know, but I have heard of it, but I don't know of any company that makes a business of preparing and using and selling raw rock in any quantity in that way directly.

Q. There may be some, may there not?

A. Yes, sir.

Q. And if it was so used it would be beneficial?

A. In time, but there would not be anything beneficial owing to the lime or gypsum; it would be simply during the gradual dissolving of the calcium phosphate by the elements.

Q. And that would be beneficial?

A. Or that the phosphorus would become in such a condition it would be taken up by the plant, and the calcium would undoubtedly be set free and have a neutralizing effect upon the soil.

(Testimony of Guy Sterling.)

Q. To that extent it would be beneficial?

A. Yes, sir.

Q. As it dissolved it would have that beneficial effect itself in time? A. I think so.

Redirect Examination.

(By Mr. DEY.)

Q. Referring to this phosphate rock, is it not $P_2 O_5$ that gives it a commercial value?

A. Yes, sir; that is the basis upon which it was always spoken of, and with which it was regarded as a business or commercial proposition.

Q. How about its being the basis for which it is mined? [440]

A. It is also the basis upon which it is mined; it is the basis upon which all phosphate rock gets its value, wherever it may be.

Q. You on cross-examination were describing at some length the uses of phosphorus in making fertilizers. Are there other uses for phosphate?

A. Oh, yes; all of the phosphorus we have that is used in the arts and manufactures is extracted from this phosphate rock; that is practically all of it. I suppose there may be a very small proportion that is extracted direct from bones, but the vast quantity of it comes from phosphate rock.

Cross-examination.

(By Mr. BUDGE.)

Q. This $P_2 O_5$; that is simply phosphoric acid chemically?

A. It is phosphoric anhydrate; it is not really an

(Testimony of Guy Sterling.)

acid; it has got to have some hydrogen with it to make an acid.

Q. What does that express, $P_2 O_5$? What does it mean? A. Phosphoric anhydrate.

Q. You say it is in that form it is sold?

A. Upon the basis of the proportion of $P_2 O_5$ in the rock that the rock is sold and valuable.

Q. Have you ever had any experience in selling phosphate rock?

A. I have not any, but you will find that in every list of quotations that is on record.

Q. I am not asking you that. I am asking you what your knowledge is.

A. I never sold or bought a pound of it.

Q. And never have seen it sold or bought?

A. No; I have not.

Q. And you have never, when you say it is the basis upon which it is mined, you have never mined any upon that basis, have you, or at all?

A. I have not mined it myself, but it is [441] almost common knowledge that that is the basis upon which it is mined, and I have had a great many assays made for the Bradleys, and that has always been the basis upon which we made the assays, to get the proportion of $P_2 O_5$ in the rock.

Q. Now, what is there in addition—what is the difference between this $P_2 O_5$ and phosphorus?

A. Just the difference between the combination chemically of oxygen and phosphorus, and phosphorus alone.

Q. Just the difference between the phosphorus

(Testimony of Guy Sterling.)

and this $P_2 O_5$ is simply the addition of the oxygen?

A. That is the chemical addition of the oxygen.

Q. The chemical addition of the oxygen does not mean then, as you have heretofore stated, on the basis or for the phosphorus alone, but for $P_2 O_5$?

A. Yes, sir; that is true. It is simply that chemically speaking for fertilizers, there is no occasion to separate the phosphorus absolutely by itself, and it is used in combination as $P_2 O_5$, which, as exposed to the air, very quickly becomes an acid itself.

Q. So that the basis upon which it is used commercially is because it is convenient, and because there is no use for phosphorus itself alone, in a commercial way, or in the fertilizer business commercially?

A. The value it has as $P_2 O_5$ is due entirely to the fertilizer business; it is not due to that part of the business which manufactures phosphorus.

Q. And as a matter of fact it is not the phosphorus itself, but $P_2 O_5$. The phosphorus would not be and could not be utilized as a fertilizer, could it? A. Not without treatment. **[442]**

Q. Not without the combination accompanying it?

A. Not without treatment, and it would not be to combine it with water.

Q. So to speak correctly about it, the basis or reason which makes this calcium phosphate valuable for fertilizing purposes is the $P_2 O_5$, the combination of phosphoric acid with oxygen, rather than the phosphorus itself in the calcium phosphate?

(Testimony of Guy Sterling.)

A. No; I don't agree with that. I say phosphorus, if you have phosphorus alone, that every one would prefer to buy it that way; it is so easy to be converted into an acid that they would prefer it that way.

Q. Can you buy it alone?

A. Yes, sir; uncombined phosphorus is manufactured in a great many places, and you can buy it alone.

Q. Uncombined with anything.

A. Absolutely uncombined with anything, pure phosphorus.

Q. From what sources is phosphorus derived that is used for other than fertilizing purposes?

A. The rock calcium phosphate.

Q. Well, do you know what amount of phosphorus is annually produced? A. No.

Q. Do you know what proportion is produced from phosphate rock? A. No.

Q. Do you know whether any is?

A. Yes, sir—I only know by reading.

Q. Where have you read it?

A. Where have I read it?

Q. Yes.

A. I think I have a statement in here.

Q. Just refer to that.

A. I will look and see if I can find it. **[443]**

Q. I mean to give us the book so that the record will show the publication where that appears.

A. I will read this, if you have no objection here, an extract from Bulletin 315, prepared by, as I un-

(Testimony of Guy Sterling.)

derstand it, F. B. Weeks and W. F. Ferrier.

Q. Well, I don't want you to read the article itself; I want you to tell me where you have read that phosphate rock is mined—no, that phosphorus is taken from phosphate rock itself.

A. All right; in this bulletin I have just referred to, on page 482.

Q. Now, by the way, before you start to read the article—was that written by Weeks and Ferrier? Examine that a little more closely. Look on page 474.

A. No; it says it was written by George W. Stose, it is bound in the book.

Q. Give the title to the article.

A. Production by States. Phosphorus Ore at Mt. Holley Springs, Pennsylvania—that is a misleading title to the part I was going to read, because that is a general discussion of the different manufacturers and method of manufacture.

Q. That is the place that you refer to?

A. That is the one, yes.

Redirect Examination.

(By Mr. DEY.)

Q. What is it, Mr. Sterling, that you were about to read about the production, from the pamphlet or book you identified?

A. It was simply a paragraph in here showing—

Q. Read it.

A. Showing that one Company manufactures phosphorus from phosphate rock obtained from South Carolina, and giving an outline of the method

(Testimony of Guy Sterling.)

used in extracting the phosphorus. **[444]**

Q. Is there anything in there about the production?

A. Yes, sir; it does say at the bottom of the page—

Q. Read it.

A. At the bottom of the paragraph—

Q. Read it.

A. In regard to the production of phosphorus?

Q. Yes; that is the question you were asked.

A. It says in addition to the domestic production the United States imports annually thirty to forty thousand pounds of phosphorus, on which a duty of eighteen cents a pound is paid.

Q. Does that say the production of the United States? A. That is what it says here.

Mr. BUDGE.—It says importing here.

WITNESS.—It does not show what is produced in the United States; it don't say what is manufactured in the United States. The price in New York, the market price ranges according to the quality from 45 to 70 cents a pound.

Q. What year does that purport to have been written? A. 1906.

Mr. DEY.—That is all.

Mr. BUDGE.—That is all.

(S.) GUY STERLING. **[445]**

[Testimony of William A. Wilson, for Complainants.]

WILLIAM A. WILSON, a witness produced by the complainants, being first duly sworn, testified:

Direct Examination.

(By Mr. DEY.)

Q. Where do you reside? A. Salt Lake City.

Q. What is your business or profession?

A. Mining engineer.

Q. How long have you resided in Salt Lake City?

A. Since about 1892.

Q. What preparation did you have for your profession?

A. I took a course in mining engineering at Columbia College, New York City, taking the degree of E. M.

Q. In what year did you take your degree?

A. That was in 1882 when I left the college.

Q. After taking your degree at Columbia College, what did you do?

A. I have been continuously engaged in the practice of my profession.

Q. Where?

A. In all the western states and Old Mexico, British Columbia, and have made a trip to Alaska.

Q. From 1882 down to the present time?

A. Yes, sir.

Q. Generally doing what, in the line of your profession?

A. Why, I started in with assaying, and have run mills, sampling mills and reduction mills; I have

(Testimony of William A. Wilson.)

been connected with mining ores, and with the examination of mining properties and of veins and lodes.

Q. Did you visit the mining ground shown on Exhibits "A" and "B," and Exhibit 1 on the blackboard?

A. Yes, sir; I have been on that ground.

Q. When?

A. Why, in 1909 I went to Montpelier, up and around **[446]** and near the Overton claim, and looked at the old workings there.

Q. What time, in October? What time in 1909?

A. That was in July, about July 9th, 1909; and then on October 29th, 1910, I started and made a very thorough trip over the claims shown on Exhibit 1 and also on Exhibits "A" and "B."

Q. (By Mr. BUDGE.) What date was that?

A. October 29th was when I made the last trip of inspection.

Q. The last trip was in company with whom?

A. In company with Mr. Sterling, Mr. Duffield and Mr. Hoff.

Q. What was the object of your visit to those properties?

A. To examine the claims and see whether there was a valuable deposit, and if so its relation to the country rock, its course and strike, and the material in the vein.

Q. I wish you would start in, Mr. Wilson, with the claims shown on Exhibit "A," and state what you found upon an examination of that property,

(Testimony of William A. Wilson.)

in respect to the formation or physical characteristics of the ore deposit, and the formations in which they were found, and what you did, fully.

A. On Exhibit "A"—this is in Wyoming. It is the Japan and China lode, which is approached from the valley by going up Raymond Canyon a ways, and then swinging off to the north. On reaching the southerly end line of the Japan lode I found several tunnels penetrating the mountains. They were in the solid mass of the mountain. I went into both of these tunnels, and in both tunnels found dark rock enclosed within well-defined walls, the walls standing about vertical, the wall on the easterly being very silicious, and what you **[447]** would call a limestone, a very silicious limestone, and the wall on the west also a limestone, but not quite so silicious from my inspection of it. I also took a sample from this discovery tunnel, and had it assayed.

Q. Did you take the sample?

A. Yes, sir; I took the sample. That sample is numbered S–1 discovery of Japan, and went or carried—

Mr. BUDGE.—Never mind what it carried.

Mr. DEY.—We do not ask him to give the chemical analysis, but just the number.

What is the the number of the sample?

A. S–1, discovery Japan.

Q. S–1, discovery Japan. Who took that sample?

A. I took that sample.

Q. From what place did you take it?

(Testimony of William A. Wilson.)

A. From the discovery of the Japan lode in the tunnel and off in a little cross-cut here showing the discovery marked at the mouth.

Q. What was exposed at the discovery?

A. This tunnel exposed a series of alternating limestone beds and a dark mineral (very conspicuous) and shaly rock. Some of these alternating beds are very silicious. The dark rock I took for the ore, and took a sample of it, took the best of it. That sample covers five feet.

Q. It covers what distance?

A. That was for the five feet.

Q. Five feet? A. Yes, sir.

Q. What did you do with it?

A. I proceeded—

Q. What did you do with the sample?

A. That sample was delivered to—I kept possession of it and brought it down **[448]** to Salt Lake and delivered it to the assayer.

Q. You kept it in your possession?

A. Yes, sir.

Q. And to whom did you deliver it?

A. R. H. Officer & Co.

Q. For what purpose?

A. For the purpose of testing and ascertaining the percentage of $P_2 O_5$ in that sample.

Q. What do you mean by $P_2 O_5$?

A. I mean the combination of phosphorus and oxygen that is contained in this mineral as the assay shows.

(Testimony of William A. Wilson.)

Q. And who did you deliver it to at Officer & Company?

A. To Mr. Jerry Black, I believe, in their office.

Q. You received from him the return or certificate of the result? A. Yes, sir.

Q. Please produce it.

(Witness produces paper.)

Said paper was marked "Exhibit 'C,' J. W. C."

Q. This Exhibit "C" is the paper?

A. Yes, sir.

Mr. BUDGE.—I understand that this only purports to show, this certificate of assay, Exhibit "C," only purports to show the percentage of $P_2 O_5$, and not the entire substance that is contained in this deposit?

Mr. DEY.—I so understand.

Mr. BUDGE.—That is correct, is it?

WITNESS.—That is correct.

Mr. BUDGE.—I have no objection.

Mr. DEY.—If counsel consents we will offer this without further proof.

Mr. BUDGE.—Yes.

Said certificate, marked "Exhibit 'C,' J. W. C.," is hereto attached and returned into court as a part of this report. [449]

Mr. BUDGE.—If you have got the other certificates, Judge Dey, covering all these samples that were taken by Mr. Wilson and Mr. Sterling, to save time in going over them, you can have them marked now, and if it is a fact, state that they were taken in the same manner in which this was taken, and let

(Testimony of William A. Wilson.)

them go in without further proof, if you wish to.

WITNESS.—I did not know the Columbia was wanted, and did not take a sample of the Columbia. Now, Mr. Hoff came down with a sample of that, and I sent that around to Officer & Company and had that assayed as a sample of the Columbia.

Mr. BUDGE.—If you say that was taken from the Columbia—

Mr. DEY.—It was taken from the Columbia. These certificates are from R. H. Officer & Company, marked Exhibit "C," J. W. C.; also Exhibit 36, J. W. C., and Exhibit 37, J. W. C., and I understand counsel we will offer them in evidence, with the understanding that counsel waives proof of the same by Mr. Officer.

Mr. BUDGE.—Yes; with the understanding that the certificates purport to show only the percentage of $P_2 O_5$, the phosphoric acid and oxygen.

WITNESS.—Phosphorus and oxygen.

Mr. BUDGE.—Phosphorus and oxygen and nothing else than those substances.

WITNESS.—That is all.

Said exhibits so marked are hereto attached and returned into court as a part of these depositions.

[450]

Q. Now, you will have those before you, and you can use them as you proceed.

A. Sample S–1 from the discovery of the Japan gives a percentage of $P_2 O_5$ of 32.3 per cent.

From these tunnels I proceeded along the side of the mountains of the Sublette Range. This range

(Testimony of William A. Wilson.)

has a northerly and southerly trend. In passing over the end common line between the Japan claim and the China claims I hunted over the surface to see if I was still following the float from this vein or lode, and I found practically the same character of phosphate rock from which I had taken the sample in the tunnel. In following over the surface of the claim to the east, at times the jutting strata showed very plainly the limiting-walls, and I pursued a zig-zag course to see the limit of all the phosphate rock or phosphorite that I could find. I did not find much until I came to the cuts at the northerly end of the China lode. In these tunnels the phosphorite ore is again shown.

Q. In place?

A. In place, but the country is rather broken and flattened out. It dips 45 degrees westerly here, with a northerly and southerly strike.

Q. Now, when you say "here," what place is that on the map?

A. The discovery tunnel of the China.

Q. Now, as you go along please give the physical conditions, and the character of your examination.

A. The inspection or examination, as I have outlined it here, is of the same character that I did on all the ground. **[451]** I would go to all the openings, and observe the walls and the contents of the lodes.

Q. If you will take it up and go through it, as you have started, by systematically giving all the details as you go along, it will save time.

(Testimony of William A. Wilson.)

A. The details are all thoroughly in my mind, and I made very short notes.

Q. Well, we want them on paper now. I want the information which you derived in reference to the vein or lode itself, as well as the dip and strike, and all the physical characteristics.

A. That is what I have given as to the Japan. Now, I have got to the discovery of the China lode, and in the discovery tunnel of the China lode I took sample S–2, and it carried or contained 11.2 per cent of $P_2 O_5$: Then, I came around the mountains to the south—

Q. Just before you go to that now, you have stated that there was a series of strata, some of them containing this mineral. Will you make it clear just the condition that is shown in the China and Japan.

A. Well, taking the discovery of the Japan lode, in entering this tunnel here the different strata of mineral and the shale or silicious rock lying between them is found standing vertically.

Q. Can you give the width or breadth?

A. This tunnel is 70 feet long.

Q. Does that cross-cut it, or is it driven on the strike?

A. In the Japan tunnel it follows in 75 feet; the note I have got is course north 70 degrees east for the tunnel, and the course of the vein is north 20 degrees west, dipping vertically. [452] Took sample of this in this tunnel in drift to the north, in 10 feet. Sample taken in place 5 feet—sample S–1. This tunnel cuts several parallel veins. This shows the

(Testimony of William A. Wilson.)

fissure running east and west. From mouth of tunnel see vertical wall on east of rock in place, and also on west of rock in place.

Q. In your opinion what constitutes the vein or lode?

A. This series of phosphorite layers that I saw in this tunnel, and with the boundaries, between the wall on the east and the west.

Q. What is the breadth of the series that you refer to?

A. Well in no place is it sufficiently developed that I could see the entire breadth, but I would say I could see about 60 feet.

Q. Your judgment is some 60 feet?

A. My judgment is I could see some 60 feet in breadth.

Q. And bounded by the walls you have described?

A. Bounded by the walls I have described.

Q. How do you determine the difference between the walls, as you call them, and this phosphorite, or mineralization?

A. Where the mineralization ceases I call that the wall; that is where I have no more phosphorite appearing in the vein, I come to the wall rock. That is the limit of my vein and lode.

Q. And is that the only explanation you can make as to the line of demarcation?

A. Yes; that is clearly the line of demarcation.

Q. Where the material changes?

A. The material changes from phosphorite to wall rock of silicious limestone—sometimes not so silici-

(Testimony of William A. Wilson.)

ous. It [453] varies in its character. It is sometimes cherty.

Q. How is it in respect to color?

A. The color—this is a kind of blue lime on the hanging, and the mineral itself very dark, and sometimes the limestone is dark blue.

Q. What is the color of the footwall?

A. The footwall is generally a lighter colored limestone, a kind of a grayish, silicious limestone.

Q. From your examination what is your opinion as to whether or not it is the same lode throughout the length of the China and Japan?

A. From my examination I would consider it the same lode passing through the China and Japan claims from end to end.

Q. And that is a lode upon which the discoveries of these respective claims appear?

A. Yes, sir; the discoveries are located on this vein or lode.

Q. Now you may proceed.

A. Leaving the Japan and China lode, I go southerly down on the westerly side of the Sublette range, and over to York Gulch to the north end of the Fryerson claim.

Q. Shown on Exhibit—

A. Shown on Exhibit "B." This end line is just southerly of the gulch, and there is a long stripping along the face of the gulch there, the southerly face, and in this stripping is the discovery of this Fryerson claim, and from near the discovery I took sample S–3 of the dark rock. [454]

(Testimony of William A. Wilson.)

Q. Did you take it in the same manner as the others?

A. In the same manner as the others, from good phosphorite ore, and from a thickness of 4 feet. This sample S–3, from the Fryerson discovery, showed in $P_2 O_5$ 34 per cent. The vein dips easterly 65 degrees, and has a course of south 30 degrees east, at the point where I took it here near the Fryerson discovery. From the discovery I traveled over the claim along the side of the mountain, over to Francis Gulch.

Q. Still on the claim?

A. Still on the claim, yes, sir, but I did not see much float or ore in place until I got over in Francis Gulch.

Q. Francis Gulch?

A. Francis Canyon, I believe it is called. The vein is again found in place on the south side of the canyon. The vein dips very steeply to the east, and is not given in York Gulch.

Q. The dip not given?

A. Dips very steeply there, almost vertically; the vein dips very steeply and slightly easterly.

Q. What is the breadth of the vein there?

A. I judged, from what the exposure there was, it was probably some 40 or 50 feet. There was no place I saw along here where there was an absolutely characteristic true vein from wall to wall.

Q. Were you able to discover the walls on that claim?

A. From traveling easterly and westerly, at about

(Testimony of William A. Wilson.)

the center of the lode, in places I could see the jutting outcrop of the sedimentary beds of which all this country is built up. This examination was made on November 15, 1910. [455]

Q. Now, what were the walls of the Fryerson?

A. The walls of the Fryerson are in both cases the limestone.

Q. There is only one case in the Fryerson, only one claim?

A. Well, in both cases where I made the examination. Here the sedimentary beds of limestone are sometimes on top and more or less silicious.

Q. Did you distinguish, and if so in what manner, the vein from the walls?

A. It could be distinguished by finding no mineralization in one, and the dark phosphorite ores.

Q. How about readily observing or seeing them?

A. For the same reason they were readily distinguished from the vein.

Q. That claim is also in the same Sublette range of mountains as shown on Exhibit "A"?

A. Yes, sir; and some thousand feet or so distant.

Q. How as to finding the vein or lode in place, Mr. Wilson?

A. Why, I considered it, judging from the amount of workings, that the vein was in place.

Q. Have you any doubt about it?

A. No, sir. At the northerly end of the China the ground is much broken up, loose rock. There is a little more work there.

Q. I am talking about the Fryerson lode now.

(Testimony of William A. Wilson.)

A. On the Fryerson I had no doubt on this end, and the other end, where I saw the vein, it was close to the southerly end line of the Fryerson.

Q. You were near the southerly end line, were you?

A. I was near the southerly end line on the Fryerson. [456]

Q. How near?

A. At about—I did not make a note of it—50 or 100 feet, I should judge, where the vein was again seen.

Q. The same vein?

A. The same vein as passed through the Fryerson.

Q. Anything else in respect to any physical characteristics on either the Japan and China or the Fryerson?

A. Nothing except my observations, which I am giving you now. Of course you could extend these notes indefinitely, taking observations every 50 feet. Here we reach the footwall, and here we reach the hanging-wall at this point, and the side lines of the claim here. I did not consider it necessary, the vein was so plainly outlined, and the walls showed so prominently.

Q. You may pass now to Exhibit 1. Your first visit there was in 1909?

A. Was in 1909, July 9th. I went from Montpelier up the canyon, looking over some old workings upon—

Q. Who was with you?

A. I think Mr. Jeffs, but it was just a little trip; we had about half an hour's time, or something like that.

(Testimony of William A. Wilson.)

Q. So it was in 1910, in October—

A. In 1910, October 29th is when I made the extended examination.

Q. Will you please start in at some point and go into detail as to that examination, as to what you found of the characteristics, the formation, and the form in which the deposit of phosphorite was found.

A. I left Montpelier and drove up the canyon, and went up Gertch Hollow in the Preuss Range of Mountains to the northerly end of the Obey claim. The country is much [457] broken, and I did not find any phosphorite until I came to the tunnels marked on the map, 1, 2 and 3. There I found the phosphorite vein, which had at that point a strike of south 10 degrees east, and a dip of 30 degrees to the west. In tunnel No. 3 I took the course of the vein, south 15 degrees east, and dips 15 to 25 degrees westerly. It was so irregular I was not sure whether it was 15 or 25.

Q. (By Mr. BUDGE.) What tunnel was that?

A. That was tunnel No. 3. Proceeding across Gertch Hollow and up on the mountain on the other side, I came to a very strong showing of the vein with the phosphorite ore in numerous cuts and tunnels.

Tunnel No. 4, I took the dip only in this tunnel. It dips 27 degrees westerly; then at the discovery I took sample No. 1, as marked on Exhibit 36 as "Montpelier 1, discovery Obey," which showed 33.6 per cent of $P_2 O_5$.

From the discovery I proceeded southerly, examining the vein as shown by a long line of strippings,

(Testimony of William A. Wilson.)

and a tunnel, and also at times ascended or descended, but looked at the rock in the vicinity to try to outline the extent and width of the lode, it not being shown by any cross-cut through it.

Q. With what result?

A. With the result that I found a continuous vein or lode of phosphorite running through this ground.

Q. By this ground, what do you mean, Mr. Wilson?

A. By this ground I mean the Obey and Obed lodes. At the discovery of the Obed lode I took sample No. 2, marked on Exhibit 36 as "Montpelier 2, discovery Obed" from 5½ feet of phosphorite. [458] The vein at this point has a strike of south 30 degrees east, and a dip of 38 degrees westerly.

Q. (By Mr. BUDGE.) That is tunnel No. ——

A. That is from the discovery of the Obed.

Q. Did you say you were unable to find the width of the lode?

A. Not positively. I got the idea it might be anywheres from 25 to 75 feet, from my inspection of the surface.

I continued this manner of investigation of the lodes, and looking at the adjacent country and examining cuts and openings wherever I could, finding phosphorite mineral in almost every case, I think in all cases where they are dug deep enough. I crossed the end line of the Obed lode and came to the Jimtown lode, and at the discovery of the Jimtown I took sample No. 3, a sample taken from 3½ feet of ore—from alongside of rich ore—could not get to the

(Testimony of William A. Wilson.)

bottom on account of the cave. I could not sample the full width of the phosphorite at the discovery of the Jimtown, on account of the caved condition of the pit.

I then proceeded to examine the country in the same manner of the Fentress lode, and at the Fentress lode took sample No. 4 from 5 feet in thickness of phosphorite, and the vein at this point showed a course south 30 degrees east, and a dip of 20 degrees westerly.

From the Fentress I proceeded to the Cumberland lode, examined the various workings on there as well as the foot and hanging-wall.

Q. A moment. Were you able to trace it so far as you have gone?

A. Trace it by these cuts? No; at times the country would [459] be pretty flat and you would not see the lode or the foot or the hanging-wall; other times it would stand out quite prominently.

From the Cumberland discovery I took sample No. 5, taken from the upper part of the vein. The course of the vein was south 15 degrees west, dipping 30 degrees westerly. Vein in place, but owing to the folding of the rock here the strike was a little different.

From the Cumberland I proceeded along the vein as outlined by the cuts and workings to the Overton lode, and there took a sample from the Overton discovery. I did not give the assay of that Jimtown sample. Do you want that put in?

Q. Yes; put it all in as you go along.

A. The sample on Exhibit 36, marked "Montpelier

(Testimony of William A. Wilson.)

No. 3," is at the discovery of the Jimtown, and contains 32.7 per cent of $P_2 O_5$.

"Montpelier No. 4, discovery Fentress" contains 32.9 per cent of $P_2 O_5$.

"Montpelier No. 5, discovery Cumberland," contained 32.8 per cent of $P_2 O_5$. There were two samples taken from the Cumberland. One was taken in the tunnel shown at the point marked 17 in red on Exhibit 1, from a cross-cut running from a point in that tunnel. It was just to determine the character of the phosphorite; and was about the same. It shows an assay of 29.04 of $P_2 O_5$ and marked "Montpelier 6–a, Cumberland tunnel."

Then, at the discovery of the Overton I took sample No. 7. [460]

The Overton has numerous workings showing the phosphorite in place and between the walls, as outlined before. One of the workings is very old, and evidently had been sunk on this dark material, but probably not known what it was at the time; there was considerable on the dumps. At the Overton discovery took the strike of the vein as south 15 degrees west, with a dip of 37 degrees westerly.

Q. It changed to the west?

A. It slewed around a little.

Q. Explain all the details.

A. That is owing to the uptilting, the manner of these sedimentary beds being tilted up or uplifted, that the strike may vary as you go along.

Q. I wish you would explain all these things as you go along.

(Testimony of William A. Wilson.)

A. Well, that explains the difference in the strike of the vein owing to the uptilting of the sedimentary beds. Sample No. 7 of the Overton assayed 32.3 per cent of $P_2 O_5$.

The next day, October 30th, came to the Mt. Pleasant lode and examined it and the numerous cuts along the surface, and took sample No. 8 at the discovery, and marked "Montpelier 8, discovery Mt. Pleasant," 31.8 per cent $P_2 O_5$. The course of the vein here was northerly and southerly, with a dip of 17 degrees westerly.

From the Mt. Pleasant lode claim I proceeded to the Arkansas claim, and again found the vein in place, with the wall rock also showing, and took a sample at the discovery of the Arkansas, which is near the southerly end line of the claim. This sample is "Montpelier 9, discovery Arkansas," 32.6 per cent of $P_2 O_5$, and from 5½ feet of rock. [461]

From the Arkansas lode I traveled over the Hickman lode, examining it in the same way for the vein and the walls, and at the discovery of the Hickman lode took sample No. 10 from 2 feet of phosphate rock in a cut which Mr. Sterling and I called No. 25. This sample is marked on Exhibit 36 "Montpelier 10, discovery Hickman," 33.4 per cent of $P_2 O_5$.

From the Hickman we traveled over the Maury lode to the Columbia lode and the Wayne lode, and at the end line of the Wayne lode, which was the crest of a ridge, we found good phosphorite—at the end line of the Wayne lode, the northerly end line of the Wayne lode, and proceeded from that end line down

(Testimony of William A. Wilson.)

to the discovery of the Wayne lode and there took sample No. 11, marked on Exhibit 36 "Montpelier No. 11, discovery Wayne," 33.4 per cent $P_2 O_5$.

At the Wayne discovery found the strike of the vein to be northerly and southerly, and a westerly dip, but I have not marked down the dip, but I think Mr. Sterling gave it at that point. That completed the examination of the claims shown on Exhibit No. 1.

Q. From your experience as a mining engineer, and your examination of this ground, did you come to any conclusion as to whether or not the vein or lode that you have referred to is continuous throughout the length of the claims platted on Exhibit 1?

A. Yes, sir; I consider that a vein or lode with a northerly and southerly strike, and a westerly dip, within well defined walls in the mass of the mountain.

Q. Is it one and the same vein or lode throughout the strike, or different? [462]

A. One and the same vein and lode. The apparent irregularity being due to the contour of the country.

Q. I was about to ask you to explain the apparent irregularity as it appears upon Exhibit 1, as to the course or strike of the lode.

A. The apparent irregularity is due to the gulches cutting the lode, the steep hillsides, and the irregularity in the uplifting of the sedimentary beds, there may be a roll on the strike, and there may be a roll on the dip, and in each case it would alter it to some extent.

Q. Will you please refere to exhibit number in

(Testimony of William A. Wilson.)

making your explanation?

A. Well, that is what I thought I had been doing. To give it more in detail, why the first surface feature that I mentioned was Gertch Hollow, which proceeds from the main Montpelier Creek in a northwesterly direction, and thus cuts the Obey claim. The next big surface feature is the Montpelier Canyon, cutting down between the Overton and the Mt. Pleasant plane. These are the two main features. There are many subsidiary gulches and gulleys all along the course of the lode; and I would say that the irregularity in regard to the strike and dip of the lode, where it changes from a course of some south 10 degrees east to south 15 degrees west and from dips varying from 15 degrees to 45 degrees, is due to the irregularity of the uplifting of the sedimentary beds. As I say, there may be a roll on either the strike or a roll on the dip, which would be ample to account for that; and [463] in addition to that why the natural irregularities which occur in the surface where the vein or lode outcrops, due more or less to the breaking down at the surface of the apex of the lode.

Q. What opinion did you form from your investigations as to whether or not there was a vein or lode within those claims?

A. As a result of my examination I came to the conclusion that the claims on Exhibit No. 1 contain a vein or lode with a dip and strike well defined, containing dark mineral phosphorite, and all located in the solid mass of the mountain.

Q. What did you find or determine to be the walls

(Testimony of William A. Wilson.)

of the vein? A. The walls of the vein?

Q. Take the hanging-wall first.

A. The hanging-wall of the vein is a limestone, one of the beds. It is a bedded vein, on account of conforming with the dip and strike of the sedimentaries which enclose it.

Q. Conformable to the sedimentaries?

A. To the sedimentaries enclosing it; and the hanging-wall, as I was saying, is this cherty limestone, and sometimes varies in character as limestone will in its course, and the same is true of this.

Q. Were you able by eyesight to distinguish it from the lode?

A. When you go up to it and examine it, this phosphorite is so plain you could readily detect it when you get to a rock outside of the vein that had no phosphorite in it.

Q. Explain how you could tell the difference.

A. By its appearance. [464]

Q. By its appearance?

A. The dark rock. The same is true of the footwall, which is limestone, very often not as silicious as the hanging-wall lime, but at times quite silicious, and usually a little lighter color, I would say, than the hanging-wall. The colors will vary with the weathering. With a long tunnel running into the vein or footwall of lime, you could see the blue lime and white lime, and the silicious character of it would show more and give its character more positively than where you see it weathered on the surface.

Q. Are there any other characteristics of a lode or vein that you found here, that you have not stated?

(Testimony of William A. Wilson.)

A. No, sir; outside of the fact of the assaying of the materials in this vein or lode, and found it to contain a valuable mineral, $P_2 O_5$.

Q. Explain what is the valuable mineral.

A. The valuable mineral is tri-calcium phosphate, a union of calcium, phosphorus and oxygen.

Q. Of commercial value?

A. Of commercial value, on account of the phosphorus contained therein.

Q. And that vein you found to exist at all places where you were able to see or observe the vein?

A. That was so. My samples were just from the discovery, but the character of the mineral which I have examined all through the lode was of that same character.

Q. Is there more than one lode or vein within walls along these claims?

A. No, sir; I consider it one lode or vein. [465]

Q. Just give your reasons for that.

A. My reason is on examination of the deposit I find that the phosphorite ore is found in alternating layers from the foot to the hanging-wall, and I think along the course they would blend into, and where there is a division of shale and silicious rock, why that in places would be eliminated, and in other places would be enlarged, coming together and filling the vein and cutting out the ore, so I consider it as one lode or vein, with these divisions in different points by layers of shale and silicious lime in the lode.

Q. Have you examined other phosphate deposits within this district or section of the country?

A. I have further to the south.

(Testimony of William A. Wilson.)

Q. How familiar are you with the phosphorite deposits throughout this section of the country, outside of these claims shown on these three exhibits?

A. I am just to confine myself to these three exhibits?

Q. Yes. A. Well—

Q. I say, have you generally, or have you had occasion to examine other phosphate deposits in this district or section of the country?

A. Yes, sir; including some in Utah.

Cross-examination.

(By Mr. BUDGE.)

Q. How long, Mr. Wilson, were you engaged in the investigation of the claims or phosphate deposits in other places than what are shown on these exhibits?

A. I would approximate it as about fifteen days altogether, different trips made. [466]

Q. At other places?

A. At other places, yes, sir; down in the Crawford range and at Hot Springs.

Q. You were there, you say, during fifteen days?

A. Altogether, I should think, I have put in fifteen days.

Q. On the ground?

A. Well, on the ground and going to and from it.

Q. On the ground and going to and from it?

A. Yes, sir; probably.

Q. How long? A. Probably ten days.

Q. Ten days. When was that?

A. That was during 1909 and 1910. I went up to the claim with Jeffs, and I went with a Professor

(Testimony of William A. Wilson.)

Koenig of Houghton School of Mines, made trips at different times for the purpose of examining the different claims of Duffield and Jeffs.

Q. And those visits comprising or embracing altogether ten days on the ground, consisted of several trips? A. Yes, sir.

Q. There was no one trip of ten days over there while you were upon the ground ten days?

A. No; I don't think so; probably five or six days.

Q. The longest? A. Yes.

Q. And the others were other trips that made up the ten days?

A. Yes, sir; made up probably a total of ten days of actual examination.

Q. Now, is that the extent of your experience in the examination of phosphate rock, outside of these here shown on Exhibits [467] 1 and "A" and "B"? A. Is that the extent of my examination?

Q. Yes; of phosphate rock.

A. Yes, sir; I have not examined phosphate rock in other portions of the country.

Q. Now, how long were you employed in the examination of the rock or deposit on the ground and in a way covered by these exhibits?

A. A little over a day and a half.

Q. That is for the China and Japan lodes and Fryerson and these other claims named on Exhibit 1? A. On Exhibit 1, yes, sir.

Q. And that is the only time you made any examination, a day and a half?

A. Yes, sir; a day and a half. This other trip which I spoke of, which I made, I estimate I think

(Testimony of William A. Wilson.)
only at half an hour or so.

Q. Now, I understood you to say that the irregularity in the dip and strike of this deposit was due, according to your judgment as a mining engineer, to the uplifts of the sedimentary deposits?

A. Yes, sir; the irregularity in that uplift mainly, with subsidiary causes owing to what water would run through the ground might make a little difference.

Q. Yes; but I am speaking in the general sense.

A. In a general sense that is really the cause of the change.

Q. In other words, it is your idea, is it not, Mr. Wilson, that this series which you denominate is the vein or lode?

A. I did not call it a series, Mr. Budge. I call it a [468] vein or lode.

Q. And then you don't accept the idea—

A. I call it all one.

Q. —that this vein or lode, as it now appears, with the walls of limestone, calcium carbonates and other cherty limestones— A. Yes, sir.

Q. —was at one time in a horizontal position?

A. Undoubtedly, yes, sir.

Q. And that the irregularity is shown—that is, what I mean by that, the whole vein or lode, as you term it, within these walls, was at one time in a horizontal position, and that its present position and irregularities of strike and dip, as now shown, were due to the irregularity of the uplifting of this deposit? A. Yes, sir.

Q. That is correct? A. Yes, sir.

(Testimony of William A. Wilson.)

Mr. DEY.—We will admit all that, Mr. Budge, so that there will not be any controversy.

Mr. BUDGE.—I know you would, but I want to get a mining engineer to admit it.

Q. Now, Mr. Wilson, you say that the mineral has the usual form of mineral—within this deposit?

A. Yes, sir.

Q. That is what is known, is it not, as a nonmetallic mineral? A. A nonmetallic mineral, yes.

Q. And it is nonmetallic in the same sense, although perhaps not of the same minerals, but it is nonmetallic mineral in the same sense that salt is nonmetallic mineral? A. Salt? Oh, no. [469]

Q. Yes. A. Sodium you know is a metal.

Q. I understand that, but salt is sodium chloride—sodium and chlorine together make salt, does it not?

A. Makes salt.

Q. Now, salt, the combination of these two substances is the same, nonmetallic mineral,—in the sense that this is? A. Oh, no.

Q. It is not? A. No, sir.

Q. It is not in the combined sense?

A. No; sodium is a metal. These divisions into metallic and nonmetallic are, however, rather shaky. One chemist will put arsenic in one class, and another in another class. In the future, or to-morrow, we may have some chemist put phosphorus among the metals in his classification. We do not know when arsenic and antimony will be in one class. It is uncertain about these two.

Q. What I want to know is this: and I am asking you to get your idea of it specifically. I understand

(Testimony of William A. Wilson.)

that sodium is a metal. That is correct?

A. Yes.

Q. And sodium, in the form in which it is found in salt deposits, is not a metal as it there exists, is not a metal in its metallic form?

A. Well, the element is there.

Q. The element is there, but it is in combination with chlorine? A. It is a salt of sodium.

Q. It is not in metallic form, in the ordinary salt bed?

A. Well, we would call it the metal sodium united with chlorine, forming a salt. [470]

Q. You would not say that the sodium that is in that salt is in its metallic form?

A. No more than we would call the gold in the chloride of gold; that the gold in it was in metallic form. It is a chloride, but the gold is there just the same.

Q. If it is in nonmetallic form, the base is there but not in a metal form?

A. It has not got the characteristics and properties of the metal element as you have got it in a pure state, but the metal is there; the gold is there.

Q. Are you familiar with the deposits of gypsum?

A. Well, I have seen them.

Q. And know their chemical contents?

A. Chemical contents, yes; it is sulphate of lime.

Q. Or calcium sulphate, as it is commonly called—

A. Calcium sulphate.

Q. —by the chemist? A. Yes.

Q. Now, that is also a nonmetallic mineral?

A. Calcium sulphate? Oh, no.

Q. Is not calcium a mineral?

(Testimony of William A. Wilson.)

A. No; calcium is a metal.

Q. I mean a metal—it is a metal, but it is not in metallic form in calcium sulphate?

A. It has the calcium there, and it is in this combination; it is a chemical combination.

Q. Now—

A. It is not in its metallic form, because if it was it would be only calcium.

Q. If it is in nonmetallic form you can say so, but I ask you whether calcium sulphate or gypsum, as it is usually called, [471] existing in the combination, is in metallic form?

A. Calcium is there as a metal sure, no matter what the combination may be there—

Q. Can't you answer my question?

A. I am answering it, you know, as I understand it.

Q. I am trying to be perfectly fair with you.

A. So am I with you.

Q. What I want to know—

A. There is no getting away from the element; the element is there all the time, no matter what combination it is, it is there; it must be.

Q. Certainly, referring to calcium phosphate, but the metal is not there?

A. It is calcium phosphate. The metal calcium is in the calcium phosphate just as in calcium sulphate, not with the physical characteristics, but it is there just the same; the element calcium or metal is there.

Q. Of course it is; but in the state that this calcium phosphate is, nonmetallic, as the term is ordinarily used and understood, it is nonmetallic, in the same

(Testimony of William A. Wilson.)

sense that calcium sulphate is nonmetallic?

A. No; it is not, because here referring to calcium phosphate, the phosphoric acid—

Q. I am not asking you anything about phosphoric acid, and I am not asking anything about what used for, I am asking simply about the chemical contents, as to whether both are not nonmetallic in the same sense. [472]

A. No. If you are considering the calcium in a strictly chemical way. As regards phosphorite ore, calcium is a metal and phosphorus is a nonmetal; it is made up of a metallic and a nonmetallic element.

Q. The two combined is a nonmetallic mineral?

A. Oh, no, you could not say that and define it in a strictly technical way. You have to put it that way—

Q. Which way?

A. That it is a combination of the metal calcium and the nonmetallic substance phosphorus.

Q. All right. Then in the same way you would define calcium sulphate to be the metal calcium with the nonmetallic substance sulphur?

A. And arsenic—

Q. That is correct, isn't it?

A. That is a union of the base calcium with the sulphuric acid to make calcium sulphate.

Q. So that we can understand one another—in the same sense that this calcium phosphate is a combination of the metal calcium with the nonmetallic mineral phosphorus? A. Nonmetallic element.

Q. Element phosphorus? A. Yes.

(Testimony of William A. Wilson.)

Q. The calcium sulphate is a combination of the mineral calcium with the nonmineral substance sulphur? A. Yes; and oxygen.

Q. There is oxygen in both of them?

A. Yes, sir.

Q. So that the oxygen does not make a distinction between them, except perhaps in quantity. And that is also true with salt or sodium chloride, as it is termed I think, isn't it? [473]

A. Sodium chloride.

Q. Is a combination of the metallic sodium with the nonmetallic element chlorine?

A. Yes, sir.

Q. Borax is a combination of the metal boron and sodium?

A. I never heard of the metal boron.

Q. Well, what is boron?

A. Boron is a nonmetallic substance.

Q. That is a nonmetallic substance?

A. Yes, sir. The sodium is the metal.

Q. So that in borax then it is the combination of the metal sodium with the nonmetallic substance boron? A. Element.

Q. That is correct too? A. Yes, sir.

Q. Now, calling your attention to veins—this deposit which you say was at one time in a horizontal position and was uplifted to its present form,—according to your idea of it, I will ask you whether or not that is the manner in which the ordinary vein, as you understand it as a mining engineer and as it is understood by mining men, comes into place?

(Testimony of William A. Wilson.)

A. Very often that would be the case.

Q. Is that the usual way in which a vein is formed?

A. It all depends on the character of the vein, but when you go into the question of the classification of veins, according to their form or origin—

Q. Let us confine it then to the gold lodes or veins.

A. Yes.

Q. Not placer deposits, but of a gold vein or lode. Does that come into place by an uplifting of the sedimentary deposit?

A. There are cases in which that is so. **[474]**

Q. Do you know of any?

A. I think I can mention one.

Q. Where? Let us have it.

A. I think on the Witwaters rand in South Africa.

Q. Have you made a particular study of that?

A. No, sir; I have never been there.

Q. Have you made a study of it by reading about it? A. By reading, yes, sir.

Q. From your reading, isn't that a vein which is cut by what is known as porphyry dikes?

A. Not that I recall.

Q. You don't remember it?

A. There may be some porphyry dikes there. I do not recollect them.

Q. You do not recollect of having read about them. Is there any other vein you know of in your experience?

A. I would like to explain about the Wittwaters rand vein. According to the writers, it is a great

(Testimony of William A. Wilson.)

saucer-shaped deposit of great extent, I do not really know how many miles it is in extent. The Mining and Engineering Journal has told us from time to time about the lode, and the gold mining done there —how they mine and mill. The uniformity of the vein has been commented upon, and how they find it at great depth—two or three or four or five thousand feet, and there find it again in practically the same condition, with the gold in it. Now that vein, the character of it, is a lot of pebbles cemented together with iron pyrites—

Q. I do not care anything about the formation.

A. I want to say—

Q. I am not interested in that. What I want to get at is— [475]

A. Well, I am coming right to the point that the question involves.

Q. Are you going to keep on talking?

A. I want to, until I get through with this question and explain—

Q. That is something I did not ask, and I don't care anything about your explanation.

A. I do; I want it to go in the record in answer to your question.

Q. You are not interested in putting into this record all this stuff?

A. Why, certainly, I want to put in what is necessary to complete my answer.

The NOTARY.—I think in this court the rule is to allow the witness to finish his answer.

Mr. BUDGE.—This is a matter that is a whole

(Testimony of William A. Wilson.)

lot different from what you ordinarily take testimony in.

Mr. DEY.—I think the witness has a right to make his answer, and that he is answering it, and I desire him to do so.

Mr. BUDGE.—My understanding is that it is not a question as to what you desire, and I would like this to go into the record, but that the witness, of his own volition, is going on with a long explanation on something which has nothing to do with the question.

Mr. DEY.—All right, you asked the question, and I think he was answering your question, which meant clearly whether he knew of any other—anything in reference to a gold [476] deposit, and he is going on to explain it, and I think he is entitled to.

Mr. BUDGE.—I did not ask him to give the explanation, but simply an instance of where there was such a deposit.

Q. Now, do you know of any other deposit?

A. I would like to have that original question read, Mr. Budge, to see whether I was answering it, and I will try to answer your question.

(Notary reading:) Q. Not a placer deposit, but a gold vein or lode. Does that come into place by an uplifting of the sedimentary deposit? A. There are cases in which that is so. Q. Do you know of any? A. I think I can mention one. Q. Where? Let us have it. A. I think on the Wittwaters rand in South Africa. Q. Have you made a particular study of that? A. No, sir; I have never been there. Q. Have

(Testimony of William A. Wilson.)

you made a study of it by reading about it? A. By reading, yes, sir. Q. From your reading, isn't that a vein which is cut by what is known as porphyry dikes? A. Not that I recall. Q. You don't remember it? A. There may be some porphyry dikes there—I do not recollect them. Q. You do not recollect of having read about them? Is there any other vein you know of in your experience?

A. It is the uplifting I was asked about there, and I was coming to that.

Q. Do you know of any other instance where a vein or lode of gold is formed by uplifting, and without any long [477] descriptions. To make myself clear, I want some instances and where located.

A. Do you know yourself the meaning of your question?

Q. I don't care about the question. Are there any other instances?

A. There is no answer to that question, because there is no vein formed by uplifting. The veins are formed and uplifted afterwards.

Q. Do you know of any other instances? If so give them to us.

A. Where the vein is formed and has subsequently been tilted up?

Q. I said, do you know of any other instances where a gold vein or lode has been at one time in a horizontal position—that is, with the mineral substance there, and afterwards tilted up?

(Testimony of William A. Wilson.)

A. Why, I suppose there are hundreds of them, Mr. Budge.

Q. Do you know of any?

A. I just see them as they are at the present day with our present eyes. We cannot tell when that gold was placed in there. We find gold along the bedding-planes of sedimentary rock. I might know of hundreds, as we see them to-day, but I cannot recognize them. I can't tell whether they are or are not from their appearance to-day.

Q. Now, Mr. Wilson, so as to avoid any further confusion, I just want to say if you will please listen to my question and then answer it and then stop, and if you have any explanation, you may make it afterwards.

A. I will try to answer your questions direct. I will answer them in the light I understand them.

Q. Do you know how the Wittwaters rand deposits are located or [478] taken up?

A. Why, I suppose by the English law.

Q. Answer the question—do you know?

A. No, of course not.

Q. You don't know then whether as a lode or placer? A. I don't believe I have got any—

Q. Well, you don't know?

A. I don't know of my own knowledge. They are taken up in thousand foot squares, as I recollect it; that is my recollection of it, but I do not know.

Q. Within certain defined boundaries?

A. Defined, common law rights, going vertically down within the lines.

(Testimony of William A. Wilson.)

Mr. DEY.—The same as in Canada.

Q. They are within vertical lines?

A. Yes, sir.

Q. They do not follow extralateral rights on the dip as they do here? A. No; they do not.

Mr. BUDGE.—I did not know whether that was the case or not.

Q. Now, from your examination of this deposit, you discover, do you not, Mr. Wilson, that there were several alternating beds of this calcium phosphate?

A. I discovered what I call a banded structure; it would be a good, high grade phosphate rock, and then might be a layer of shale, and look like it had considerable phosphorus in, and there might be a hard lower lime and another layer of phosphate, and in that way had a kind of a banded structure, as you would see it in the section of the vein. [479]

Q. Was not the limestone wall in between a well defined wall of limestone?

A. I could not call it wall at all. I expect if I should drift on what you call the wall I would go 50 feet and come to the point—

Q. Did you see any evidences of a point?

A. There is no such amount of work that you could tell that.

Q. Did you ever see one of those limestone beds pinch out?

A. Why, I saw it in a general way, because when we took some of the samples on the strike of the ore I saw 5 feet, and other places 3 feet. There must be a diminution in the thickness of the phosphorite

(Testimony of William A. Wilson.)

rock in different places.

Q. Did you see any evidences of pinching out of the limestone rock, or any place where it did pinch out? A. In the manner I have described.

Q. Did you see any place where it had pinched out, where you come to the end of the limestone strata?

A. Why, I think I must have, because I came to that conclusion.

Q. Did you, do you know?

A. Positively, because I came to that conclusion.

Q. Do you remember any?

A. I can't put my finger on the spot.

Q. Do you remember ever having seen it?

A. I can't put my finger on any spot.

Q. Can you answer the question? Do you remember now of any such?

A. I remember it in the way I have stated.

Q. You haven't in mind any particular point?

A. No, sir; no particular point. [480]

Q. On any of these deposits where you saw that condition?

A. No; I can't say that, but that is the conclusion of engineers who have examined mines and veins, that you see them pinch out and increase in size.

Q. Now, you spoke about this China lode. What do you consider to be a fissure?

A. A fissure is a rupture of the rocks of the earth, in a general way.

Q. Any fissure on these deposits?

A. Yes, sir; I mentioned one that was right in the face of that—

(Testimony of William A. Wilson.)

Q. That is what I want to call your attention to.

A. The China lode.

Q. (By Mr. DEY.) The Fryerson?

A. No; it was the Japan lode, right in the face, there is a fissure running out easterly here—

Q. I mean of this deposit, in which this deposit is located.

A. Why, I saw evidence of slickenside movement, you know, but I would not know whether that was a fissure, from what evidences I saw, or whether due to the uplifting that I saw of the strata.

Q. And it is reasonable to suppose, according to your idea, that it was due to the uplifting?

A. It could be explained that way.

Q. It is a reasonable explanation?

A. It is a reasonable explanation.

Q. Now, then, did you see anything—any of these deposits concerning which we are interested in, did you see any fissure other than what you have indicated there? [481]

A. I suppose I must have because these gulches and things are lines of fissures, you know.

Q. I am not asking you for what you suppose, or what must be so. I ask you what you did see. Do you know what you saw? A. At what point?

Q. Any point.

A. I have not connected a point where I—

Q. In there, I said.

A. In there? I certainly saw the rocks fissured in a number of places along there.

Q. Will you answer my question?

(Testimony of William A. Wilson.)

A. You ask me where I see any fissures. I am telling you right along in the hanging-wall and footwall there are fissures in innumerable places, sometimes only called joints and cleavage planes, in other places would be strict fissures.

Q. Is it your interpretation of a fissure—so that I can get your idea of a fissure—as a mining engineer, do you contend that the space between what you call the hanging and foot wall is a fissure?

A. No, sir.

Q. It is not a fissure, as you state?

A. No; not in this bedded vein.

Q. It is not a fissure in the sense you use that term?

A. No. There may be open spaces along these beds that allowed the accumulation of phosphorite. It is a bedded vein conforming to the strata.

Q. So that the walls between which this substance is found is not a fissure in the sense in which it is used among mining men and mining engineers?

A. No. A fissure vein is only the filling of a fissure. [482] Now, owing to the uplifting there might have been such a thing as the beds parting along the bedding-planes, a rupturing of the beds, and the vein at that point will make a swell and be thicker.

Redirect Examination.

(By Mr. DEY.)

Q. Will you please explain with respect to depositions of mineral and physical conditions in that

(Testimony of William A. Wilson.)

South African place that you were asked about, the Witwaters rand.

A. The mineral or ore seemed to enclose or surround pebbles that were cemented together with pyrite of iron, iron pyrites, which had the valuable constituent—the gold. This has been mined extensively and at great depth. The physical form of the deposit is a great saucer-shaped basin, and the conclusion is that it was more or less sedimentary when it was formed, with the gold in it; and by uptilting it has been given its present form.

Q. Locally in this country, are there any sedimentary deposits containing gold, silver or other metals?

A. Why, recent writings in regard to the occurrence of lead in Illinois, Wisconsin and Missouri. A theory has been advocated (I think Professor Janney) that the lead occurring in that country was deposited at the time the lime was laid down.

Q. Are you familiar with the Silver Reef in Utah?

A. Yes.

Q. What are the conditions there?

A. The Silver Reef is an occurrence of silicious sedimentary rocks, one layer of which has become impregnated with valuable ore and has been mined for such. [483]

Q. Located as a lode?

A. Located as a lode, as I understand it.

Q. Referring to the chemical combinations about which you were cross-examined, take tin, lead, zinc and iron. Do any of those appear except in chem-

(Testimony of William A. Wilson.)
ical combination?

A. Do any of them appear?

Q. Yes.

A. Gold and lead in a native state are found at times.

Q. I say do they occur except in chemical combination?

A. Yes; when they are native they occur; but the greater occurrence is in a combined state.

Q. Does iron occur in a native state?

A. Very seldom; in meteors it sometimes occurs.

Q. From meteors?

A. But that is about the only occurrence I know of.

Cross-examination.

(By Mr. BUDGE.)

Q. Don't you remember, Mr. Wilson, from your study of that South Africa gold deposit which you have named, that the deposit contains porphyry dikes, and that the theory of the geologists is that the gold which is found in that deposit was taken in there in solution through these dikes by percolation, from those dikes?

A. That is not my remembrance, but that would be no reason geologists should come in conflict—

Q. Don't you remember that that is the accepted idea of geologists on it? A. No, sir.

Q. Now, this salt, borax and gypsum all are taken up under the [484] placer law?

A. Well, I don't know as to borax, because we have got veins of borax.

(Testimony of William A. Wilson.)

Q. What is your understanding about it?

A. Why, I think if it is a vein it would be a lode.

Q. Well, how about salt?

A. Salt? Why, I think the Government has passed such laws as tell you how to take it up; otherwise if it had been a vein like this phosphate rock, why I would have said to take it up as a lode.

Q. Do you know how salt deposits are taken up?

A. I believe the Government has outlined how they are to be taken up. I think as placers.

Q. As placers. And isn't that true also of limestone?

A. Limestone? I believe limestone comes under the limestone and sandstone quarry act.

Q. But they are sedimentary deposits?

A. They are sedimentary rocks.

Q. And auriferous cement also?

A. Why, in California where there is a level place I believe it is taken up under the placer law.

Q. I am calling attention to the cement deposits up here. I think what they call Weber Canyon.

A. Oh, there is one up here in Parley's Canyon.

Q. They are taken up as placer?

A. They will be taken up under that act. There are sedimentary beds around there containing the proper constituents to make cement. [485]

Q. They are taken up as placers?

A. That is the way the Government says to take them up.

Q. That is true also of fire-clay?

A. As to fire-clay, I think it is true, but as each

(Testimony of William A. Wilson.)

case comes up, why the Government specifies under what act it shall be taken up. Of course, no placer rock is in place.

Q. Are you familiar with the borax deposits down in California, near to a place known as Daggett?

A. No, but I have seen them at Sodaville, Nevada, and down at the Lilly mine, where borax is in a fissure, down near Greenwater.

Q. Have you seen the gypsum deposits down here near Nephi?

A. No, but I have further down at Cedar City.

Q. They are all placer?

A. I think that is the Government instructions, to locate them as placers.

Q. You don't know of any gypsum in this country that is taken up in any other way, do you?

A. No.

Q. Or salt either, or any of these others I have named? A. No, sir; I don't know of any.

Mr. BUDGE.—That is all.

(Signed) W. A. WILSON.

Mr. DEY.—It is stipulated that I can take these Exhibits 1, "A" and "B," with me to Pocatello, for the hearing at that place, and bring them back and return them to the notary who has taken the testimony in these cases.

Mr. BUDGE.—Yes; we will agree to that. We would like to have them there ourselves.

* * * * * * * *

[486]

Stipulation [Concerning Performance of Discovery Work, etc., on Certain Claims].

Mr. BUDGE.—It is hereby stipulated and agreed that on or about the 8th day of July, 1904, as to the Winfield, Winter, Wonder and Winslow placer mining claims; and that on or about the 22d day of August, 1904, as to the Wilmington placer mining claim; and that on or about the 11th day of June, 1904, as to the Colcock and Inman placer mining claims; and that on or about the 3d day of December, 1905, as to the Wizard placer mining claim (all of which said claims are particularly described in the cross-bill herein); the predecessors in interest of the defendant, the San Francisco Chemical Company, performed all the acts required by law in respect to making a discovery upon said claims [492] respectively, and in performing the requisite discovery work, and in duly marking the boundaries of said placer mining claims, and each of them, and in posting the notices of location.

Also, that the location notices so posted were in due form, and that copies thereof in due form were duly recorded.

Also, that the requisite work of at least $100.00 a year has been performed for the benefit of each of said placer mining claims, during each calendar year since the location of said claims respectively, and that proofs in due form have been made of said work, and that said proofs have been duly recorded.

It is also stipulated and agreed that on or about the 15th and 16th days of November, 1907, the complainants, Morse S. Duffield and Lewis A. Jeffs, in

reference to the Obey, Obed, Jimtown, Fentress, Cumberland, Overton, Mount Pleasant, Arkansas, Hickman, Columbia and Wayne lode mining claims, described in the bill of complaint herein, performed all the acts required by law in respect to making a discovery upon said claims respectively, and in performing the requisite discovery work, and in duly marking the boundaries of said lode mining claims and each of them, and in posting the notices of location.

Also, that the location notices so posted [493] were in due form, and that copies thereof in due form were duly recorded.

Also, that the requisite work of at least $100.00 a year has been performed for the benefit of each of said lode mining claims during each calendar year since the location of said claims respectively, and that proofs in due form have been made of said work, and that said proofs have been duly recorded.

Provided, however, that this stipulation is not intended to in any manner destroy the effect, if any, of any evidence now in the record, or which may hereafter be taken on behalf of the defendant, as to the circumstances under which said lode locations were made and said assessment work for the benefit of said lode mining claims was performed; it being the intention to stipulate only as to the performance by each party of the physical acts required by the laws of the United States and of the State of Idaho and the State of Wyoming in the location of placer and lode claims respectively, and in the performance of assessment work, and the making of proof thereof.

Also, the record title being in the respective parties as alleged in the pleadings herein. [494]

[Testimony of Randolph H. Groo, for Defendant.]

RANDOLPH H. GROO, a witness called in behalf of the defendant, being first duly sworn, testified as follows, to wit:

Direct Examination.

(By Mr. BUDGE.)

Q. How old are you, Mr. Groo?

A. I am 35 years old.

Q. Where do you reside?

A. Montpelier, Idaho.

Q. How long have you resided there?

A. About 30 years, more or less.

Q. What is your occupation?

A. I am a quartz miner.

Q. How long have you been engaged in the business of mining? A. About 17 or 18 years.

Q. And where?

A. In Utah, Idaho, Montana, Colorado, and British Columbia.

Q. On what kind of properties have you worked?

A. I always worked on what is termed quartz mines.

Q. Quartz mines? A. Yes, sir.

Q. That is, lode claims, you mean?

A. Yes, lode or quartz—lode—vein.

Q. Have you ever worked on placer?

A. No, sir, never, but of recent years I—on this.

Q. Well, I mean other than the work you are en-

(Testimony of Randolph H. Groo.)

gaged in now, have you ever been engaged in work on placer claims? [495] A. No, sir.

Q. Now, in whose employ are you at this time?

A. The San Francisco Chemical Company.

Q. How long have you been working for the company? A. Five years.

Q. That is the defendant in this case?

A. Yes, sir.

Q. And where have you been working for the company?

A. Most of the time at Montpelier. I worked some in Wyoming, and Utah.

Q. Wyoming and Utah? A. Yes, sir.

Q. Calling your attention, Mr. Groo, to what is marked as "Exhibit 1, J. W. C.," which is Complainant's Exhibit 1, are you familiar with these placer claims known as the Colcock, Winfield, Inman, Wonder, Winter, Winslow and Wizard?

A. Yes, sir.

Q. And with what is known as the Waterloo placer? A. Yes, sir.

Q. And also with what is known as the Wilmington placer? A. Yes, sir.

Q. Where is the Wilmington from the Colcock—in which direction? A. It lays east.

Q. Straight east? A. Yes, sir.

Q. Now, during the time since 1905, is it upon these properties that you have worked?

A. Yes, sir, at Montpelier. [496]

Q. At Montpelier? A. Yes, sir.

Q. Are you also familiar with the lode claims

(Testimony of Randolph H. Groo.)

known as the Obey, Obed, Jimtown, Fentress, Cumberland, Overton, Mount Pleasant, Arkansas, Hickman, Maury, Tennessee, Columbia and Wayne?

A. Yes, sir; I know where they are.

Q. Are you familiar with their boundary lines and corner stakes, as the same are marked on the ground? A. Yes, sir.

Q. Now, you may explain, Mr. Groo, what particular mineral body or mineral deposit occurs within the boundary lines of these placers which I have named.

A. Why, there is a bed of lime phosphate existing in these placers; that is, the outcrop of it.

Q. And does that appear or is it exposed upon each of these placers? A. Yes, sir.

Q. Just describe the bed—how it occurs on the ground.

A. I don't just understand what you mean.

Q. Just tell us how it appears—what it looks like there on the ground—on these various claims.

A. Why, it makes just the same as a limestone ledge does most generally, only it is a different color; it makes right in the series of rock. Wherever this particular rock happens to be exposed you find the phosphate along with it.

Q. What rock is that you are talking of?

A. This limestone rock—limestone ledges.

Q. Now, just describe how this calcium phosphate deposit [497] occurs, with reference to the rocks that surround it.

A. It makes right with it, whichever—

(Testimony of Randolph H. Groo.)

Q. What is on either side of it?

A. It follows the rocks.

Q. What is on either side of it—above it and below it? A. Limestone.

Q. Limestone?

A. Immediately below it and above it. In some places there isn't anything over the bed except loose wash.

Q. Now, are you familiar with the Waterloo mine?

A. Yes, sir.

Q. So called? A. Yes, sir.

Q. And I will ask you if upon that claim there is any place where the phosphate appeared at the surface without any overlying rock?

A. Yes, sir.

Q. And where, with reference to the tunnel of the Waterloo mine?

A. Will you just point that tunnel out, please? Well, it is just above the main tunnel.

Q. In which direction—West, or East, or what?

A. East.

Q. East? A. Yes, sir.

Q. And do you know what has been mined, or approximately what quantity has been mined there from that particular place, from the surface?

A. There has been about 5,000 tons. [498]

Q. Are there any other places within the placer claims; that is, within the Wizard, or the Winslow,—

A. I beg your pardon. I would like to state here that I was asked whether or not there was any overburden whatever on this. There was some—that it

(Testimony of Randolph H. Groo.)

was stripped right off—

Q. Well, what was it?

A. In places there was limestone, and in places there was nothing but dirt—wash.

Q. Yes. And what other places within the boundary lines of any of these placers which I have named (either the Wizard, the Winslow, the Winter, the Wonder, the Inman, the Winfield, the Colcock, or Wilmington), what other place—place or places within the boundary lines of these placers, do you find the phosphate rock without any overlying bed of limestone?

A. Near the North end of the Wizard.

Q. And to what extent—what area, approximately,—is there in that condition?

A. On the Wizard, I should judge there was—judging from the amount taken off of the Waterloo claim—I should judge there was at least 10,000 tons on the Wizard that could be easily stripped and quarried in an open quarry.

Q. Any other place besides the North end of the Wizard?

A. On the Winslow there is fully that much.

Q. Whereabouts on the Winslow—what part of it? A. It would be in the northeast corner.

Q. Any other place, on any of the other claims?

A. There could be considerable ground stripped on the Wilmington. That wasn't asked, though.

Q. Yes, I asked about the Wilmington. [499]

A. Oh, yes.

Q. Now, as to these places concerning which you

(Testimony of Randolph H. Groo.)

have testified, where the phosphate rock could be mined in an open quarry, would it be possible to mine it in any other fashion, or any other method?

A. No, sir; it would be utterly impossible to mine it underground.

Q. That is, by underground workings?

A. Yes, sir.

Q. Now, from your experience as a practical miner, would you call this deposit of calcium phosphate a lode or vein? A. No, sir.

Q. In what respects does it differ from a lode or vein?

A. In all lodes that I ever worked in—and I worked in—that is all I ever did do work in, that kind of mines—they had a distinct wall on either side, as a rule of different material within the ore of itself; it was a different character of material—a different character of rock.

Q. Now, is this bed that is being mined of different rock, or is it the same character of rock on either side of it?

A. Well, it is a little different; but of course, I am not a geologist; but from what they have told me—

Mr. DEY.—Never mind that.

Mr. BUDGE.—Yes; never mind that.

Q. Calling your attention to this underlying bed of phosphate, is the rock above it a phosphate rock also? A. Yes, sir.

Q. The rock below it is phosphate?

A. Just straight limestone. [500]

(Testimony of Randolph H. Groo.)

Q. Now, what other distinguishing characteristic do you have in mind which distinguishes this from a lode, as you understand a lode, from your experience?

A. Lodes often—I have worked in a great many of them—often occur with a dip just opposite to the formation; just whatever the regular dip of the formation is, a lode or vein will dip just the opposite direction. This runs identically with it.

Q. With what?

A. With the formation around it; it has the same dip. The main reason I don't think it is a lode is because it has no gangue matter.

Q. What do you mean by "gangue matter"?

A. I mean gangue is stuff that ores makes with—quartz. That is what I call gangue. This phosphate, the full bed is mined, all of it; there is no sorting.

Q. And in the mining of it, is there any extraction of this phosphate?

(No answer.)

Q. Is there any sorting in this?—

A. No, sir.

Q. In this phosphate mining? A. No, sir.

Q. And does it contain any "gangue," as you call it? A. No, sir.

Q. Do you know of any lode in your experience but what did contain gangue? A. No, sir.

Q. Now, how does the gangue differ—so it may be more [501] clearly explained—how does the gangue differ from the rock—the country rock on

(Testimony of Randolph H. Groo.)

either side in a lode?

A. Well, it is usually of different material, but it is perfectly worthless. It comes in different forms; sometimes it is a soft talcky substance that ore makes in; sometimes it is a hard quartz-like substance that the material makes in.

Q. The refuse that is in the deposit?

A. Yes, sir.

Q. And that is within the walls? A. Yes, sir.

Q. Now, what have you to say concerning the apex of a lode, and what is claimed as the apex of these lode claims on this phosphate deposit? Do they differ, or are they the same? A. They differ.

Q. In what respect?

A. Why, the apex to this phosphate bed is wherever the erosion happens to make it. If there happens to be a swail, or a hollow, it would form an apex. If there happens to be a sag in the ground, and the erosion has been great enough, it forms another apex, with the dip extending on up the mountain.

Q. In other words, from the point that is within the boundaries of these lode claims looking up the hill above the boundary line of the lode claims, there is a deposit of phosphate? A. Yes, sir.

Q. And where does that occur? In what places have you mined where that occurs?

A. You have reference to the lode claims?

Q. Yes. A. On the Arkansas— **[502]**

Q. I meant where is it that the phosphate deposit occurs outside of the boundary lines of the lode

(Testimony of Randolph H. Groo.)

claims and farther up the hill?

A. There is one place on the Wilmington It occurs on the Winslow, above the Mount Pleasant lode claim.

Q. Above the Mount Pleasant lode claim?

A Yes, sir.

Q. And where else, if you know?

A. On the Wizard, above the Arkansas, I think.

Q. Does it occur above the Hickman lode?

A Yes, sir.

Q. And does the deposit extend easterly?

A. Yes, sir.

Q. Outside of the boundary lines of the Hickman lode? A. Yes, sir.

Q. Another bed, is it, or another bed than that found on the Hickman?

A. Why, it is the same bed.

Q. Calling your attention to the manner in which these lode locations appear, are they located with reference to the strike as lode claims are located?

A. No, sir.

Q. In what respect do they differ?

A. Well, a lode location is made along the strike, of course on the dip; but a lode is supposed to have, according to my understanding, a regular dip, either one direction or another.

Q. Has this a regular dip?

A. Yes, sir, it has. Yes, it has a regular dip, certainly. [503]

Q. Well, are the claims—the lode claims—located with reference to the dip, as lode claims are located?

(Testimony of Randolph H. Groo.)

A. No, sir.

Q. Well, where do they differ? In what respect?

A. Well, these lode locations are made—if they would follow the dip they would run into each other. One goes around on the dip—

Q. If they follow the dip, you mean, or if they follow the strike?

A. If you follow the strike—if you follow the outcrop, where the phosphate outcrops?

Q. Yes.

A. If you follow that around, your claims run right into each other. You have got one claim running to the—would be dipping into the northwest; you have got another claim dipping into the southwest—which would be contrary to locating a lode.

Q. Well, calling your attention particularly to the Mount Pleasant; how is that claim located with reference to this particular deposit?

A. Well, if you commence working on the Mount Pleasant on what would be termed the apex in a lode, the dip would be up out of the ground, instead of being a dip down into the earth.

Q. I will ask you, is the Arkansas lode claim higher up or lower down than the Mount Pleasant?

A. It is higher up.

Q. It is higher up? A. Yes, sir.

Q. Now, is there an outcrop of phosphate on the Arkansas lode? **[504]** A. Oh, yes.

Q. Now, in which direction does that bed of phosphate which the outcrop of it is on the Arkansas lode, dip? In which direction does it dip?

(Testimony of Randolph H. Groo.)

A. It dips to the West

Q. It dips to the West? A. Yes, sir.

Q. And where is the next exposed from the Arkansas? A. Upon the Mount Pleasant.

Q. And where is the Mount Pleasant with reference to the creek—Montpelier Creek?

A. It lays just East of it.

Q. And what part of the bed which dips from the Arkansas into the Mount Pleasant is exposed on the Mount Pleasant?

A. I beg your pardon. Will you read that question?

(The last question was repeated.)

A. It would be the lower edge of it.

Q. The lower edge of it? A. The westerly edge.

Q. From the outcrop which occurs on the Mount Pleasant, is there any deposit of phosphate which dips down into the earth? A. Not that I know of.

Q. Well, have you been over the ground?

A. Yes, sir.

Q. And the only deposit which is found on the Mount Pleasant, or which outcrops on the Mount Pleasant, extends in which direction—the bed, I mean,—up the hill, or down the hill? **[505]**

A. It extends up the hill.

Q. Is there any portion of this deposit, Mr. Groo, which you now have stripped ready for open quarry work? A. Yes, sir.

Q. Where is it?

A. It is located on the Waterloo.

Q. Is there any other near that, that is mineable

(Testimony of Randolph H. Groo.)

only by open quarry, in addition to this that is stripped off?

A. Yes, sir; there is a great deal. We are preparing now to—that is, we are running a raise from below it, cutting up from under the heavy overburden up to where the overburden is light, preparing a place there that we will take out, judging from what we have taken out, I should imagine about 20,000 tons.

Q. And that also will be taken out as an open quarry? A. Yes, sir.

Q. And can it be mined in any other way?

A. No, sir.

Q. Now, how do you mine this phosphate rock, Mr. Groo?

A. We mine it by drilling it, or by drilling it with this coal auger, under steel—picking it, blasting it with giant powder.

Q. And by means of shafts and tunnels, or inclines, or what? A. By a tunnel.

Q. A tunnel?

A. We have never mined it any other way. [506]

Cross-examination.

(By Judge DEY.)

Mr. Groo, how long have you been familiar with the ground shown on Exhibit 1? A. Five years.

Q. Have you examined this exhibit, so that you are familiar with it?

(No answer.)

Q. If not, I wish you would.

Mr. BUDGE.—Just step over here, Mr. Groo.

(Testimony of Randolph H. Groo.)

(The witness did so, and examined said exhibit.)

A. I think that is all the examination I need of that.

Q. In a general way, describe the topography.

A. The which?

Q. The topography.

A. I don't understand what you mean.

Q. The lay of the ground.

A. The lay of the bed, or the lay of the claims?

Q. The lay of the country?

A. Why, this bed of phosphate runs along the face of the mountain, dipping to the west. It is a—

Q. No— Well, what I was getting at is, Mr. Groo, first, the lay of the country shown on Exhibit 1. Are there any gulches? A. Oh, yes.

Q. It is a mountain range, is it? A. Yes, sir.

[507]

Q. And what gulches—whereabouts is there a gulch?

A. There is a gulch—the main canyon gulch cuts right through the limestone which underlies the bed of phosphate. It also cuts through the upper limestone.

Q. I take it, then, it is a deep gulch?

A. The Montpelier Canyon, yes, sir.

Q. The Montpelier Canyon, you call it?

A. Yes, sir.

Q. And broad? A. Not very—just medium.

Q. What lode claims on Exhibit 1 are represented at this Montpelier Canyon, on either side of it?

A. The Mount Pleasant, the Overton, the Cumber-

(Testimony of Randolph H. Groo.)

land, the Tennessee,—

Q. This is the Tennessee away over here. (Indicating upon Exhibit 1.) Do you mean that?

A. I was following on other land there.

Q. Well, you can come up nearer, Mr. Groo, so that you can correct it, if you want to. Now, you have mentioned the Mount Pleasant, and the Overton, and the Cumberland.

A. It is near the Montpelier Canyon.

Q. Is it down in the gulch?

A. No; it is up on the hill.

Q. That is what I am asking you—down in the gulch—across the gulch—any of them? In other words, just explain here on Exhibit 1 what you were attempting to describe about the Mount Pleasant lode.

A. Explain about the—

Q. You were speaking about a dip up hill. Explain that **[508]** in connection with Exhibit 1 and in connection with the gulch or canyon.

A. The Arkansas here is located upon what is supposed to be the apex, dipping down off on the Mount Pleasant.

Q. What is this here? (Indicating upon Exhibit 1.) A. The creek. This lays on the sidehill.

Q. The Arkansas you mean now?

A. The Arkansas lays on the sidehill, dipping to the West. It runs—the bed lays on the face of the mountain, the same mountain dipping down to the west. The Montpelier Creek—canyon—cuts the bed out down to the Mount Pleasant, which leaves

(Testimony of Randolph H. Groo.)

the exposures dipping—still dipping to the west; but it is cut off there; it has gone out of the canyon.

Q. By the erosion?

A. By the erosion, yes, sir.

Q. Exactly.

A. Consequently, the dip of the Mount Pleasant would be up the hill. The Arkansas is here, the exposure is up here, and the exposure down there. The Mount Pleasant is located right down here. (Indicating upon Exhibit 1.)

Q. Below? A. Below the Arkansas.

Q. Where the erosion has cut the bed of phosphate? A. Yes, sir.

Q. Exactly. And that is due to the conditions that exist at this Montpelier Canyon, that the bed has been cut—washed out by erosion?

A. Yes, sir.

Q. Starting in on Exhibit 1 at the Obey lode, it is covered, **[509]** I take it, by the Colcock placer. Where do you find this deposit of phosphate outside of the boundaries of the Obey lode—if at all?

A. The Obey is all on the Colcock, is it?

Q. Well, come here and see, so that you will be sure.

Mr. BUDGE.—Step right over here.

(The witness did so.)

A. This is the Obey here? (Indicating.)

Q. This is the Obey. (Indicating.) The Obey comes up to here. I am calling attention to that in reference to the Colcock first. Is there any deposit— A. Why, it lays— Yes, sir.

(Testimony of Randolph H. Groo.)

Q. Whereabouts on Exhibit 1?

A. Well, sir, I can't tell you from that.

Q. Well, if you can't tell from that, is it an extension from the Obey to the North on the Colcock placer?

A. I don't know whether there is any exposure there or not, above the Obey on the Colcock.

Q. If it exists at any place, it would be to the North of the Obey lode, would it not?

A. I don't know as to that.

Q. Then, as I understand you, you can't state that at any place on the Colcock placer, outside of the portion included within the Obey lode as shown on Exhibit 1, there is no phosphate deposit found?

(No answer.)

Mr. BUDGE.—Speak up, Mr. Groo, if you can. We don't want to consume too much time.

A. Well, I was trying to call to mind the ground without **[510]** the map, as it lays. I don't know of any exposure.

Q. Passing now to the Obed and Jimtown lodes. Is there any of this deposit of phosphate ore within the exterior boundaries of the Inman, Winfield or Colcock placers, outside of the exterior boundaries of the Obey, Obed and Jimtown lodes?

A. I don't know of any.

Q. And is that true of the portion of the Fentress that lies within the exterior boundaries of the Winfield placer?

A. I don't know of any exposure; no.

Q. Passing now to the Winter placer; is there any

(Testimony of Randolph H. Groo.)

phosphate deposit of ore found within the exterior boundaries of the Winter placer outside of the boundaries of the Fentress, Jimtown and Cumberland lodes? A. I don't know of any.

Q. Is there—the same question, let me ask you, Mr. Groo, in reference to the Wonder placer, and the Cumberland and Overton lodes?

A. I don't know of any.

Q. Passing next to the Winslow placer; is there any of this deposit of phosphate ore found within the exterior boundaries of the Winslow placer outside of the exterior boundaries of the Overton lode and Mount Pleasant lode? A. Yes, sir.

Q. Whereabouts, showing by Exhibit 1?

A. This is North, isn't it? (Indicating.)

Q. Yes.

A. There is a patch right here. (Indicating.)

Q. In what direction would that be? **[511]**

A. That would be the North- —

Q. —East— A. —East—

Q. —end?— A. —end,—

Q. —of the Mount Pleasant lode?

A. —of the Mount Pleasant lode.

Q. And North— In other words, northeast of the northeast end of the Mount Pleasant lode, and near the northeast corner of the Winslow placer?

A. Yes, sir.

Q. Now, taking the Arkansas lode and the Wizard placer; taking the Arkansas and the Hickman lodes and the Wizard placer; is there any of this deposit of phosphate ore within the exterior boundaries of

(Testimony of Randolph H. Groo.)
the Wizard placer outside of the exterior boundaries of the Arkansas and Hickman lodes? A. Yes, sir.

Q. Whereabouts—East, or what?

A. East of the Arkansas, and East of the Hickman.

Q. Now, then, I take it,—I just want to ask Mr. Groo one question—I take it that this is the East boundary line of the Wizard placer? (Indicating upon Exhibit 1.) A. Yes, sir.

Q. Now, the witness wants to understand the map. Answer the question.

A. There is on the Hickman, but not that I know of on the Arkansas.

Q. Now whereabouts, by Exhibit 1, in reference to the Hickman lode? **[512]**

A. Well, it would be along the East side line of the Hickman lode.

Q. Are you sure of that? A. Yes, sir.

Q. To what extent is it traceable?

A. Not to a very great extent.

Q. I wish you would mark it, if you please, in some way, about where it is.

A. It would be along somewhere in here, I think. (Indicating upon Exhibit 1.)

Q. It would be by the figure 99.16, east of the Hickman lode?

A. I imagine somewhere in there.

Q. Passing now to the Wayne lode and the Wizard placer; is there any portion of this deposit of phosphate ore within the exterior boundaries of the Wayne placer and outside of the general boundaries

(Testimony of Randolph H. Groo.)

of the Wayne lode?

Mr. JACK.—Of the Wizard placer, you mean?

Judge DEY.—Of the Wizard placer; yes.

A. I don't know of any.

Q. So that so far as these placer claims are involved, in this case,—you are familiar with the names of them, are you? A. The placers?

Q. Yes. A. Yes, sir.

Q. Namely, the Wilmington, the Colcock, the Winfield, the Inman, the Winter, the Wonder, the Winslow, and the Wizard; the **[513]** entire deposit of phosphate ore within the boundaries of those placer claims I have mentioned is found within the exterior boundaries of the several lode claims, except only in the instance of the Hickman lode claim which you have just described. Is that the fact?

A. No, sir—the Hickman and the Mount Pleasant.

Mr. BUDGE.—He said there was some off of the Mount Pleasant.

Judge DEY.—Oh, yes.

Q. With the exception of the Hickman and the Mount Pleasant, which you have just described?

A. Yes, sir I believe that is—

Q. —right? A. —right.

Q. Describe, if you please, in your own way, the dip of this phosphate deposit.

A. It dips to the west.

Q. A regular dip to the west? A. Yes, sir.

Q. Do you know about how many degrees dip it is?

A. Why, I have measured it in a great many places. It varies a little; some places 20°, some places 30°.

(Testimony of Randolph H. Groo.)

Q. And in all cases conformable to the stratification—or dip of the country rock? A. Yes, sir.

Q. Has it a strike? A. Yes, sir.

Q. Do you know what the strike is, or course? [514] A. North and south.

Q. Northerly and southerly? A. Yes, sir.

Q. Course and strike? A. Yes, sir.

Q. Is the dip into the mountain?

A. Not on all the claims.

Q. Well, all except the Mount Pleasant, that you have just referred to? A. No, sir.

Q. Except at the canyon, where the erosion has occurred, is the dip into the mountain?

A. No, sir.

Q. Well, just tell us how it is.

A. It dips right along with the—the quarries below the Waterloo claim. It is a flat country and the dip is right with the mountain, until it comes down to where it is flat, and I suppose it goes on underneath it.

Q. You can trace it from the north end as shown on Exhibit "A"—the Obed lode—down through to the Wayne, can't you? A. Yes, sir.

Q. Exposed in many places—the outcrop?

A. Yes, sir.

Q. And at all these outcrops, at certain places stripping has been done, has it not?

A. Well, I suppose you would term it stripping. It has been uncovered in a great many different places.

Q. Now, do you find one or more stratas of this phosphate ore? [515]

(Testimony of Randolph H. Groo.)

A. We find more than one.

Q. Within what boundaries?

A. Why, you find it exposed in any of these placer claims mentioned—in the boundaries of these placer claims.

Q. Oh, yes; but I mean within what boundaries enclosing this deposit?

A. Well, I don't know just how wide these series are.

Q. They haven't been cross-cut at any place?

A. Oh, yes.

Q. Eh?

A. We have a cross-cut there through them for at least 120 feet at the mine—the Waterloo mine.

Q. That is the Waterloo mine? A. Yes, sir.

Q. Any other place?

A. Yes; there are a number of other places. On the Winter—on the Wonder there is a cross-cut.

Q. Now, what is your idea or opinion as to what constitutes a vein?

A. Well, a vein, in my ideas, would be a body of metallic rock—ore—making between defined walls, walls of a different character to the stuff itself, having a regular strike, and having a dip.

Q. Now, we have in this case a definite strike and a dip, do we not? A. Yes, sir.

Q. You have stated that this ore was distinguishable by the color of the rock in which it is found? [516] A. I didn't say that.

Q. Didn't you? —that you could tell it by the different color from the walls or boundaries?

(Testimony of Randolph H. Groo.)

Didn't you say that? A. I say it now.

Q. Yes; I think you said it. And just describe the difference in color by which it is distinguishable.

A. The phosphate rock itself is of darker color than the walls within which it makes. Each layer of the phosphate is that way.

Q. A darker color? Could you state what the color is?

A. Well, it varies. It is black and broken—

Q. But it is darker than the walls?

A. —and white and gray.

Q. Now, the walls you have stated are limestone, I believe? A. Yes, sir.

Q. Cherty limestone?

A. There is no cherty limestone immediately over the commercial bed of this rock.

Q. Well, now, to understand you, is there more than one stratum or layer of the phosphate rock that is of commercial value, within the series you have mentioned? A. I don't know of any.

Q. Just the one? A. Yes, sir.

Q. Now, then, when you were referring to the walls of limestone, were you referring to the immediate boundaries of this one commercial stratum, or to the series of strata that [517] contain the phosphate ore? A. To this one commercial stratum.

Q. To the one? A. One commercial bed.

Q. To the one? A. Yes, sir.

Q. Now, what is the immediate overlying or hanging-wall of that?

A. Well, it is a highly fossilized limestone.

Q. And what is the lower wall, or footwall?

(Testimony of Randolph H. Groo.)

A. A limestone.

Q. Eh? A. It is a limestone.

Q. Of what thickness is this underlying stratum of limestone?

A. I don't know. I never went through it.

Q. Then, it is very thick? A. Evidently.

Q. And how in respect to the hanging-wall of highly fossilized limestone?

A. You mean the roof rock over the bed?

Q. Yes—how thick is that?

A. Well, it varies; in places it is about three feet, and other places there isn't any limestone over it.

Q. Where you have referred to places where there was no limestone overhanging, have you reference to certain places where erosion has broken it away?

A. Yes, sir. **[518]**

Q. Now, will you designate those spots or places on Exhibit 1? Just make a letter "E," we will say.

(The witness marked said exhibit.)

A. I don't claim that all these will be that way.

Judge DEY.—No—I will have you explain that when you have made your "E" marks.

(The witness continued marking the exhibit.)

Q. How many "E's" did you mark?—two?

A. Two.

Q. I notice that you have placed an "E" at the northeast, beyond—just beyond—the northeast end line of the Mount Pleasant claim, and within the Winslow placer? A. Yes, sir.

Q. Just describe in your own way the conditions there.

A. That lays on a tolerably level surface, upon a

(Testimony of Randolph H. Groo.)
kind of a flat on a hill, on the Mount Pleasant; and the places that I have marked on the Hickman is a steeper sidehill, dipping to the west.

Q. Now, Mr. Groo, maybe I can ask a question or two to make it plainer to us: What do you find there at these two places you have marked Exhibit "E"—or which you have marked with the letter "E," I should say?

A. What character of stuff?

Q. No. What did you find—yes, what did you find there? Of what does it consist in general? How is it found?

A. Why, there is rocks and wash and limestone.

Q. What has produced or caused that condition?

A. I am not a geologist. I couldn't tell. [519]

Q. Oh, no, I don't mean anything geological at all; I mean the simple condition as you find it, as a miner, how did it come there? Where did it come from? Was it in place in the mountain?

A. The phosphate is in place, as near as any of the other—

Q. Well, but this wash that you are speaking of—does that contain phosphate rock?

A. Nothing other than just float.

Q. All just float, you call it?

A. That is, the dirt that you first get on top of the surface; you go under that and you find the phosphate rock, that is as near in place as any of the rest of it.

Q. Yes—just the same as any of the rest of it?

(No answer.)

(Testimony of Randolph H. Groo.)

Q. And both of these places that contain the wash and float that you have marked with the letter "E" are outside of the lode claims? A. Yes, sir.

Q. And does the deposit continue through the ground that you have designated by the letter "E"? Does the deposit of phosphate rock continue through that on its course or strike?

A. Yes, sir, it does to where, it is cut off by the Montpelier Canyon.

Q. Well, at the places—at the two places you have marked with the letter "E" on Exhibit 1?

A. Yes, sir.

Q. So that is it not the fact that, excepting for the [520] float found as you have described, that all of the deposit of phosphate rock or ore is found upon these lode and placer claims in the form and manner with dip and strike as you have described them?

A. Lode and placer claims?

Q. Within the exterior boundaries of the lode and placer claims? A. Yes, sir.

Q. Now, you are familiar, of course, with the discovery point or places of the several lode claims—of the several placer claims—are you not?

A. Yes, sir.

Q. Can you point out on Exhibit 1 the discovery place on the Wilmington claim?

A. Well, the Wilmington—

Q. Mr. Hamer, just change the Wilmington to the Colcock placer.

A. Why, it would be somewhere near the southeast part of the claim—the discovery.

Q. Would it be within the boundaries of the Obey

(Testimony of Randolph H. Groo.)

lode? A. Yes, sir.

Q. And upon the course or strike of this deposit of phosphate ore? A. Yes, sir.

Q. Passing now to the Winfield placer; where is the discovery of the Winfield placer?

A. I think that is about in the center *of* near to the west side line, about in the center of the claim.

[521]

Q. Within the exterior limits of the Jimtown or Obed lodes? A. Yes, sir.

Q. And upon the course or strike of this deposit of phosphate rock which you have described, running through this property? A. Yes, sir.

Q. Passing now to the Inman placer; where is the discovery of that?

A. It would be to the northeast corner somewhere.

Q. Within the limits of the Obed lode?

A. Yes, sir.

Q. And upon the course and strike of this deposit?

A. Yes, sir.

Mr. BUDGE.—It is agreed that the discoveries on each of the placer mining claims of the defendant were made within the exterior boundary lines of the lode claims of the complainants, except as to the Wilmington placer, upon which there are no lode claims.

Judge DEY.—Yes—that makes that plain.

Q. Just a question or two: At the two places on the Exhibit 1 you have marked with the letter "E," are there any workings?

A. Our workings, or whose workings? —anybody's?

(Testimony of Randolph H. Groo.)

Q. Yes. A. At these two places?

Q. Yes. A. Yes, sir. [522]

Q. Both of them?

A. I don't think there is any, however,— I don't think there is any much work done on the Hickman where I marked it; there is a great deal of work at the—

Q. —at the northeast end of the Mount Pleasant?

A. —the Mount Pleasant.

Q. Eh? A. Yes, sir.

Q. A tunnel, or what? A. No, sir.

Q. What is it? A. Pits.

Q. Pits? A. Yes, sir.

Q. Sunk on the deposit?

A. Driven along on the bedrock, cutting the—it was—where the deposit was exposed there is a great number of pits driven along right with the strike.

Q. At right angles—no—right with it?

A. Right with the strike. At other places there is pits driven at right angles with the dip—square across it.

Q. And ore has been mined and extracted there?

A. There has been ore taken out of these pits; there has been nothing shipped.

Redirect Examination.

(By Mr. BUDGE.)

Q. Now, Mr. Groo, calling your attention to the places at which the phosphate is exposed outside of the boundary lines [523] of the lode claims, do you say that there are no other places except what you have marked "E" where the outcrop goes be-

(Testimony of Randolph H. Groo.)

yond the lode boundaries?

A. I remember one other place now; it would be on the north end line of the Arkansas lode.

Judge DEY.—Please mark it as "E2."

(The witness did so.)

Q. Are there any other places?

A. I don't remember any more just now.

Q. Well, are you certain that there are no other places? A. No, sir.

Q. Now, calling your attention to this Exhibit 1, and to the Obey lode, I will ask you whether or not the deposit runs out of the Obey lode over into the Wilmington? A. Yes, sir.

Q. And across from the east boundary line of the Obey lode crosses the Colcock placer over on to the Wilmington? A. Yes, sir.

Q. And there may be other places, or are there any other places?

A. There may be—I wouldn't say for sure—not that I remember distinctly now.

Q. Now, calling your attention to this bed of phosphate rock (and by that I mean the commercially valuable bed), that is the lower bed, isn't it?

A. Yes, sir.

Q. Now, underneath that is what kind of stone?

A. Limestone. [524]

Q. Now, immediately above that particular layer bed or commercial bed, what is the overlying bed?

A. That is a highly fossilized limestone, containing some phosphate, so geologists have told me.

Q. Well—

(Testimony of Randolph H. Groo.)

Judge DEY.—I move to strike out what he has been told.

Mr. BUDGE.—Yes; I don't care anything about that.

Q. That fossilized limestone that you have referred to as being immediately above the lower bed of the phosphate rock, that is not the limestone that we commonly call the cap lime of the series?

A. No, sir.

Q. Well, how thick is this fossilized limestone?

A. It varies a little bit—from three feet to nothing.

Q. Now, were you working on these claims, Mr. Groo, in 1908 and 1909, and 1910? A. Yes, sir.

Q. Did you have a conversation with Mr. Wilcox, an employee of Duffield and Jeffs? A. Yes, sir.

Q. When was that?

A. It was on October 27th, 1908.

Q. Where?

A. In Montpelier Canyon, on the Winter placer claim.

Q. Who was present?

A. Mr. Wilcox—and he had three men with him.

Q. Do you know who they were? [525]

A. I know two of their names, I think. I think one of them was Ennis; another one was his nephew; another, Wilcox.

Q. And who were with you?

A. Well, if I can remember correctly there were four men with me.

Q. And what was the conversation that you had? Just tell us what you said and what he said in reply.

(Testimony of Randolph H. Groo.)

A. When they attempted to camp, or stopped to camp, I told them—forbid them doing any work on the ground; and he went then and held a little consultation with his men, and went off by himself like, or by theirselves, and then he came back, and he asked me if they didn't leave the ground what we proposed to do, and I told him that we proposed to put him off physically, if he didn't go.

Q. Well, what did he say?

A. He said, by God he wasn't being paid any fighting wages, and that he would leave.

Q. And did he leave?

A. Yes, sir; he left; he went right down the canyon ahead of us; we followed him down, and he left his camp there—his camp outfit—down on what was then Joe Bagley's ranch.

Q. You say that was in October, 1908?

A. Yes, sir.

Q. When did the workmen for Duffield and Jeffs next come on the claim?

A. On November 30th, 1908.

Q. And under whose charge were they at that time?

A. I think Mr. Colbath was the foreman. [526]

Q. How long did they stay there, Mr. Groo?

A. Well, they didn't leave until the middle of March—from the 30th of November until the middle of March.

Q. Do you know the exact date in March?

A. It was the 19th when they completed, I think.

Q. Now, was any work done on the lode claims by

(Testimony of Randolph H. Groo.)

or on behalf of Duffield and Jeffs at any time during the year 1909, after the 19th day of March?

A. No, sir; none that I know of.

Q. Well, were you there? A. Yes, sir.

Q. On the ground all the time? A. Yes, sir.

Q. And none was done, you say?

A. No, sir.

Q. Now, did you have a conversation with Charles Hoff, the foreman for Duffield and Jeffs, during the year 1910? A. Yes, sir.

Q. What time of the year?

A. It was on April 13th.

Q. 1910? A. 1910.

Q. Where?

A. That would be on our—on the Winslow placer.

Q. And what was the conversation you had with Mr. Hoff?

A. I notified Hoff that he was trespassing, and forbid him doing any work at all.

Q. What did he say?

A. He said all right; he would notify his people, he [527] termed them, and do as they said.

Q. And had he pitched his tent then, or established a camp?

A. They were just commencing to build a tent.

Q. Did he leave the premises?

A. He left the premises, yes.

Q. When did he come back?

A. On the 18th of April, 1910.

(Testimony of Randolph H. Groo.)

Recross-examination.

(By Mr. JACK.)

Q. When was that first conversation with Mr. Hoff, did you say?

Mr. BUDGE.—There was only the one with Mr. Hoff.

Q. When was that conversation? On what date was that? A. On the 13th of April, 1910.

Q. And he left the premises after your conversation on the 13th of April, 1910? A. Yes, sir.

Q. Did all the men that were with him leave the premises at the same time? A. Yes, sir.

Q. There was no one on the ground between the 13th of April, 1910, and the 18th of April, 1910?

A. Not that I ever saw.

Q. Were you up there each day between?

A. I was on our property, yes. [528]

Q. Didn't they have their camp pitched up there?

A. They had it started—they had started to pitch camp.

Q. And did they remove the tents? A. No, sir.

Q. Just left it there? A. Yes, sir.

Q. Did you say anything to them when they went back on the 18th of April, 1910? A. No, sir.

Q. In 1908 you had a conversation with Wilcox and the men upon the ground? A. Yes, sir.

Q. And informed them that they were trespassing?

A. Yes, sir.

Q. Did you ever know of any suit—injunction suit—that was brought by Duffield and Jeffs against the owners of the placer claims, asking an order of

(Testimony of Randolph H. Groo.)

the court that they be permitted to do their assessment work? A. No, sir.

Q. Do you know whether or not such a suit was brought? A. No, sir.

Q. After they returned in November, 1908, to do their assessment work, you gave them no further orders about keeping off, or trespassing?

A. No, sir. I had been instructed between the time—October 27th and November 30th—to permit them to go ahead and do their work without any—

Q. Well, from whom did you receive those instructions? [529] A. Our manager.

Q. Was that Mr. Taylor? A. Yes, sir.

Mr. JACK.—That's all.

Mr. BUDGE.—I will say, Judge Dey, that I may desire to recall this witness again for a few questions; but that is all at this time. [530]

[Testimony of Richard A. Sullivan, for Defendant.]

RICHARD A. SULLIVAN, a witness called in behalf of the defendant, being first duly sworn, testified as follows, to wit:

Direct Examination.

(By Mr. BUDGE.)

Q. What is your name?

A. R. A. Sullivan—Richard A. Sullivan.

Q. And where do you reside?

A. Montpelier, Idaho.

Q. What is your occupation?

A. Cashier of the First National Bank, Montpelier, Idaho.

(Testimony of Richard A. Sullivan.)

Q. How long have you been cashier, Mr. Sullivan?

A. About three years, recently.

Q. Do you hold any office or employment with the San Francisco Chemical Company, the defendant?

A. Yes, sir.

Q. What? A. State Managing Agent.

Q. The designated statutory agent?

A. Yes, sir.

Q. And how long have you been such agent of the ccompany?

A. Why, four or five years—four years, I think, probably.

Q. Prior to the time that you became Cashier of the First National Bank, in what work were you engaged, Mr. Sullivan?

A. I had charge of the clerical end of the office and looked after the assessment work.

Q. Of what? For whom? [531]

A. For the San Francisco Chemical Company.

Q. On what claims?

A. On all their claims—those of Montpelier Creek, and in Wyoming and elsewhere—Utah and elsewhere.

Q. The Montpelier claims to which you have referred are those that are shown on this Exhibit 1?

A. Yes, sir.

Q. Now, I will ask you whether, in the fall of 1907, you were engaged in this work you have just described, for the company? A. I was.

Q. Are you acquainted with the complainant, Mr. Duffield? A. I know the gentleman by sight.

(Testimony of Richard A. Sullivan.)

Q. And with Mr. Jeffs? A. By sight, also.

Q. Did you have any conversation with these gentlemen, or either of them, during the fall of 1907?

A. No.

Q. Did you, in the fore part of January 1908?

A. Yes.

Q. Where?

A. On the Winslow placer claim, in Montpelier Canyon.

Q. And who was present at that time, Mr. Sullivan? A. Mr. Duffield and Mr. Jeffs.

Q. Was anyone with you?

A. My wife was with me, but in the cutter, some distance away on the road.

Q. I see. Just state what the conversation was that you [532] had with the complainants at that time.

A. On the afternoon of the 3d of January, 1908, Mr. Duffield, Mr. Jeffs, Mr. Colbath and one other young man came in on the afternoon train to Montpelier, and I understood that they had stated they were going to do their assessment work on those claims. It being my duty to ascertain whether or not they intended doing so, or were going to do so, and I particularly watched their movements. On the morning of the 6th of January, 1908, they, in a wagon, started up from Montpelier toward the claims, and when they got to the head of Main Street in Montpelier they turned south. I presumed that they had gone out to the lake—out to the Hot Springs, possibly. However, as a matter of pre-

(Testimony of Richard A. Sullivan.)

caution, in the afternoon I, with my wife, went up on the claims, and in going up we saw nothing. I went up for the purpose of ascertaining whether or not they were on our claims. Coming back, as I was passing an opening in the timber on the creek, I noticed a tent, and I stopped and got out and went over there, and Mr. Jeffs was outside of the tent. I didn't know him personally at the time, as to who he was and what he was doing there, and he told me that he was Mr. Jeffs, and that he was there in the cause of their placer claims—of their lode claims. During the conversation Mr. Duffield came out of the tent. However, he done very little of the talking; Mr. Jeffs done most of it; and I informed them both that they were trespassers; that they were on the San Francisco Chemical Company's ground—placer ground—and ordered them off. Mr. Jeffs expostulated, saying that they had a perfect right to remain there, as they had lode locations over our placer locations, and under the law, he contended that they were entitled to do so. [533] I told them that I didn't wish to have any trouble, personally or otherwise, but that they would have to move off the ground; otherwise we would be compelled to force them off. And with that I went away.

Q. Now, did you have any conversation with either of these gentlemen prior to that time, personally?

A. I had with Mr. Duffield on the 6th of December, 1907—that is, a very short conversation.

Q. Where was that, Mr. Sullivan?

A. It was in front of the San Francisco Chemical

(Testimony of Richard A. Sullivan.)

Company's office, in Montpelier.

Q. And who was present?

A. Mr. Ferrier, Mr. Taylor and myself.

Q. You may detail that conversation.

A. Mr. Taylor and myself had gone up the canyon in the morning to make some measurements and to look after some work, and when we got up on the Wonder claim, just across the line from the Winslow, on the west side of the creek—on the north side of the creek—Mr. Taylor had gone in the tunnel and I was standing outside and happened to glance across the creek south, or southeast, and I observed—I saw in a narrow gulch which was obscured from the road, two men working. When Mr. Taylor came out I called his attention to it, and we went over there. There were two men digging a pit, and whose names I afterwards ascertained to be Mr. Colbath and Mr. Sampson, I believe. I asked them what they were doing there, and they said, "Oh, prospecting." I said, "For what—for gold?" and they said, "Well, most anything." I said to them, "Gentlemen, I wish to inform you that this ground has been located, and belongs to [534] us—the San Francisco Chemical Company—the parties whom I am representing, and you are trespassers, and we don't want any trouble with you, but we want you to discontinue working here and get off the ground." They said, "Well, we are not seeking any trouble." I asked them if they were working for themselves, or in the employ of some other parties. They informed me that they were working for Mr. Duffield and Mr. Jeffs.

(Testimony of Richard A. Sullivan.)

Q. Did they leave?

A. They left immediately, yes, sir.

Q. And did you have any conversation with Mr. Duffield on that day, after that incident?

A. After these gentlemen had left this work, I drove down town with Mr. Taylor, and as we got in front of the San Francisco Chemical Company's office Mr. Duffield drove up, and he asked me if I was the sheriff. I told him no. That was all the conversation. No—he asked me if I would tell him where the Sheriff was—where he could find him—and I told him that I thought he was in town that morning—Mr. Frank Wright was the Sheriff at the time—and by that time Mr. Ferrier came out, and that was all the conversation I had with Mr. Duffield at that time.

Q. What conversation occurred between Mr. Ferrier and Mr. Duffield, if any?

A. Mr. Ferrier informed Mr. Duffield that we had informed him he was up on our ground, trespassing, and forbid him going back, or going on the ground as a trespasser.

Q. What did Mr. Duffield say in reply?

A. Mr. Duffield said that he had taken the opposite side of the question; he contended that the ground was lode, and had [535] so located it, and he felt that he had a right to go on the ground, which Mr. Ferrier denied, and simply—the conversation simply went off in their saying—Mr. Duffield said that it was a matter for the courts to decide, and the courts would have to decide the matter later, or words to that effect.

(Testimony of Richard A. Sullivan.)

Q. Was anything said in that conversation about the matter having been decided in the Waterloo placer contest?

A. I think not at that conversation. That is, it might have been—I rather believe it was—but during my conversation with Mr. Duffield and Mr. Jeffs which I have referred to, on the 6th of January, the matter was brought up; I brought the matter up as antecedent as to the condition of the ground, that we owned the Waterloo claim and had received a patent from the Government as placer, and it was at the instance of Mr. Jones, the former locator, having relinquished his titles and withdrawn from the case, or under an agreement to that effect.

Q. What did Mr. Duffield say in reply to your statement that the Waterloo patent should settle the matter?

A. He simply said that it wasn't a matter. I stated, however, in connection with that that it was a matter for the United States Land Office to dispose of; and Mr. Duffield, and Mr. Jeffs especially, stated that they didn't consider it so; that it was a matter for the courts to decide.

Q. Who was Ferrier?

A. Ferrier was the manager of the San Francisco Chemical Company at that time.

Q. Did you have any other conversations with either of these parties at any other time?

A. I don't remember any other conversation. [536]

(Testimony of Richard A. Sullivan.)

Cross-examination.

(By Mr. JACK.)

Q. The conversation in which you spoke about the Waterloo patent having been issued, was the one held December, 1907?

A. No; it was on January 6th, 1908?

Q. 1908? A. Yes, sir.

Q. You informed Mr. Duffield that he was trespassing upon your ground? A. Yes, sir.

Q. Ground that belonged to the San Francisco Chemical Company? A. Yes, sir.

Q. Did they own the ground at that time?

A. They did by right of location and having complied with the statute and doing the assessment.

Q. Did the San Francisco Chemical Company make the placer locations?

A. I don't think so, no.

Q. Do you know who did make them?

A. I don't remember the names, no, not in detail.

Q. Do you remember any of them?

A. I do, yes, sir.

Q. Who are some of the locators?

A. I was one of the locators myself, on a few of them. Mr. Taylor, I believe, was one of the locators.

Q. Mr. Goodfellow?

A. Mr. Goodfellow, and Mr. Eells also, I think. [537]

Q. Eight parties joining in the location, was there? A. Yes, sir, that is my recollection.

Q. And when you told Mr. Duffield that he was trespassing upon your premises, you said that it was the San Francisco Chemical Company that owned

(Testimony of Richard A. Sullivan.)

these premises that he was trespassing upon?

A. I wouldn't say as to the exact wording as to that. It was ground that I was representing here.

Q. And you were representing the San Francisco Chemical Company?

A. And the locators of the claims as well.

Q. Well, which were you representing?

A. Both.

Q. Well, which one owned it? A. Both.

Q. Both owned it? A. Yes, sir.

Q. How do you make that out?

A. I was representing the parties who had made the locations, through the San Francisco Chemical Company.

Q. You mean that these parties located the claims for the San Francisco Chemical Company?

A. No, sir.

Q. Well, what interest did the San Francisco Chemical Company have in these placer locations on the 3d of January, 1908, at the time of this conversation?

A. I wouldn't say as to whether or not the claims had been transferred to them at that time, though I think they were. However, they had charge of the ground, in behalf of [538] the owners? If it had not been deeded to them already, or transferred, I wouldn't say positively, because I don't remember the dates.

Q. The San Francisco Chemical Company had charge of the ground on behalf of these eight individual locators? A. Yes, sir.

Q. By what kind of an arrangement?

(Testimony of Richard A. Sullivan.)

A. I couldn't say as to that.

Q. You were one of the locators?

A. I was one of the locators, yes, sir.

Q. What kind of an arrangement did you have with the San Francisco Chemical Company to represent you in regard to these claims?

A. I had deeded them my interest in the claims.

Q. Had you at that date?

A. I couldn't say positively as to that particular date.

Q. You had an agreement that you would deed it to them? A. No, sir, not until the deed was made.

Q. Well, do you say that you had an arrangement with them to represent you in regard to this claim?

A. With the other locators, yes, sir.

Q. And you are unable to say what the arrangement with the San Francisco Chemical Company was in regard to representing the locators of those claims?

A. Nothing more than in a general way they were financing the proposition, largely.

Q. Were they not financing it entirely?

A. I couldn't say positively as to that. **[539]**

Q. Did you have anything to pay in regard to the expenses connected with these locations?

Mr. BUDGE.—We object to this as immaterial.

A. I did not, sir.

Q. When you made the location with seven other parties, did you make it for or on behalf of the San Francisco Chemical Company?

A. No, sir; we made it for ourselves.

Q. And did you afterwards sell the claims to the

(Testimony of Richard A. Sullivan.)

San Francisco Chemical Company?

A. They were transerred to the San Francisco Chemical Company, yes.

Q. Was it a sale? A. Yes, sir.

Q. And did any consideration pass between the locators and the San Francisco Chemical Company for this transfer of title? A. Yes, sir.

Q. What was the consideration?

Mr. BUDGE.—We object to this as immaterial. Answer the question, Mr. Sullivan, if you know.

A. It was a money consideration, to some extent.

Q. To what extent?

A. Well, to the extent that I was—as far as I was personally concerned, by employ by the company.

Q. Your employment by the company was the consideration for your— [540]

A. A part of the consideration, yes, sir; that is, that covered the consideration, practically.

Q. Do you mean that in consideration of the transfer of your interest in these placer locations to the San Francisco Chemical Company, that company agreed to employ you at some compensation?

A. No, sir; I was employed before that—before I had made any locations.

Q. And then on account of your being an employee of the San Francisco Chemical Company, you transferred title to them? A. Yes, sir.

Q. And that was the only consideration?

A. Yes, sir.

Q. And so far as you know, was that the consideration for the other seven locators?

A. I couldn't say.

(Testimony of Richard A. Sullivan.)

Q. You don't know anything in regard to that?

A. I don't know anything about that.

Q. Have you had charge of the accounts of the San Francisco Chemical Company? A. Yes, sir.

Q. Did you ever pay any of the other locators besides yourself any consideration for or on behalf of the San Francisco Chemical Company for this transfer?

A. I had nothing to do with the claims whatever.

Q. You never made any yourself? A. No, sir.

Q. Now, when you informed Mr. Duffield, at that first [541] conversation that he was trespassing, did you tell him who owned that ground, or on whose behalf you were making that warning?

A. I said, unquestionably, "We own the ground"—having reference to the locators and the San Francisco Chemical Company as well.

Q. Whoever the title stood in? A. Yes, sir.

Q. Do you know of any suit being brought subsequent to that, to secure an injunction against the San Francisco Chemical Company, or these eight individual locators, preventing them from interfering with Duffield and Jeffs in doing their assessment work?

A. I remember seeing no legal documents to that effect.

Q. Do you remember any such suit having been brought?

A. I heard that such a suit had been contemplated.

Q. And isn't it true that by subsequent agreement between the parties in interest, Duffield and Jeffs were permitted to continue their assessment work?

(Testimony of Richard A. Sullivan.)

A. I so understood it, yes, sir.

Q. That was in January, 1908, that you so informed him, you say?

A. That I so informed them?

Q. Yes. A. Yes, sir.

Q. At that first conversation you say you had some conversation in regard to the placer—no—at the second conversation, was it,— [542] A. Yes.

Q. —you had some talk in regard to the placers and the lodes? A. Yes, sir, the second.

Q. The second conversation? A. Yes, sir.

Q. Were you at that time—and by "you" I mean you as one of the locators of the placer claims—or the San Francisco Chemical Company, protesting the patent of the Bradley lode location?

A. I didn't quite catch the question. Just read that question.

(The last question was repeated.)

A. I was one of the protestants on the Bradley patent, at the start, but I don't remember the date; I couldn't say whether it was at that time.

Q. Didn't you inform Mr. Duffield in that conversation in January, 1908, that you were so protesting?

A. I don't remember having so said.

Q. And didn't Mr. Duffield tell you at that time that that was conclusive evidence that the question of lode or placer had not been settled?

A. I don't remember the conversation as to that particular. I know that he contended that it had not been settled, but I wouldn't say as to that particular matter.

Q. Didn't you tell him that you were glad he was

(Testimony of Richard A. Sullivan.)

making it a lode contention against a placer, instead of trying to secure the ground as a placer? [543]

A. I did not; no, sir.

Q. In the conversation December 6th, 1907, do you say that Mr. Ferrier informed them that they were trespassing upon the premises? A. Yes, sir.

Q. Did he tell them whose premises?

A. I couldn't say as to that. I was at some distance. I didn't hear all the conversation. I went on in the office before they got through talking.

Q. Did you hear him say they were trespassing upon the premises? A. Yes, sir.

Q. Did he say whose premises?

A. I don't remember.

Q. For whom was he acting when he said they were trespassing upon the premises?

A. He was acting as Manager of the San Francisco Chemical Company, and also representing the locators of the placer claims.

Q. The locators, then, had two representatives on the ground?

A. He was the Manager—the head representative there.

Q. For whom?

A. For the locators and the San Francisco Chemical Company, as before stated.

Q. Were the locators employing him, or the San Francisco Chemical Company?

A. I couldn't say as to that, sir. [544]

Q. Well, is it not a fact that at the time of those placer locations, that each of the eight parties joining in the locations was an employee of the San Fran-

(Testimony of Richard A. Sullivan.)

cisco Chemical Company? A. I don't know.

Q. Do you know whether any of them were?

A. Some of them, I think, were; yes, sir.

Q. Which one?

A. Mr. Taylor was one, I believe.

Q. Mr. Eells? A. I couldn't say.

Q. Mr. Goodfellow?

A. They were San Francisco parties, and I have no means of knowing.

Q. Hadn't they ever been on the ground—Mr. Eels and Mr. Goodfellow?

A. Not during my time.

Q. You say that you told Mr. Duffield that you—you as individuals, or the San Francisco Chemical Company—had secured the rights of Mr. Charles C. Jones? A. How is that?

Q. Did you tell—just repeat that.

(The last question was repeated.)

A. I don't remember saying it in that particular way. I simply said that on the Waterloo contest, because that Mr. Jones had backed down and relinquished any claims which he might have had to the ground.

Q. What kind of a claim, if any, did Mr. Jones have?

A. He had put lode locations over each of the placer locations. [545]

Q. The same as Duffield and Jeffs have?

A. I believe so, yes, of a similar nature; in fact, the lines correspond exactly.

Q. And you purchased a relinquishment or trans-

(Testimony of Richard A. Sullivan.)

fer of the title to those lode locations from Mr. Jones?

A. I don't understand the question.

(The last question was repeated.)

A. I don't know of any purchase. Mr. Jones quit, and relinquished any title which he had—without purchase, as far as I know.

Q. You mean they paid him nothing for the transfer of his title?

A. So far as I know they never.

Q. But he did give a transfer of his lode claims to you and the other locators of the placer claims?

A. He simply relinquished his rights, whatever he had. He abandoned his rights, in other words, and permitted the locators to go ahead and patent this ground, without protest.

Q. Did he relinquish that right to you as individual locators, or to the San Francisco Chemical Company? A. I don't remember as to that.

Q. Do you remember what ground was covered by these lode locations to which Mr. Jones relinquished his right? Was it the same ground that is now covered by the lode claims of Duffield and Jeffs, which are in dispute in this case?

A. Practically so, I think—absolutely so, in fact.

Q. Well, after your conversation with Mr. Duffield and Mr. Jeffs in December, 1907, and January, 1908, Mr. Duffield and Mr. Jeffs did go ahead and perform their assessment work? [546]

A. Later in the fall, yes.

Q. After your talk with Mr. Duffield and Mr. Jeffs

(Testimony of Richard A. Sullivan.)

on January 6th, 1908, did they cease work upon the claims?

A. Yes, sir; there was no work to my knowledge until later in the fall—till that fall—later that fall.

Q. Did you know that they didn't go ahead and do any work? Were you out there each day thereafter?

A. Very nearly so.

Q. Did they leave the ground on the day that you had this conversation with them—January 6th, 1908?

A. I believe that they came down town that evening; if not, the following day. I wouldn't be positive as to that; but it was at that time.

Q. You were out to the claims nearly every day, you say, after this January 6th conversation?

A. Quite regularly; I wouldn't say every day—very nearly so—quite regularly.

Q. For what purpose did you go out?

A. To look after the property and see that there were no trespassers, and we were doing assessment work, I believe, shortly after that date, if I remember correctly.

Q. Did Mr. Ferrier go out?

A. Mr. Ferrier went out quite frequently; I wouldn't say as to any particular dates.

Q. Which one of you had charge of the work at that time?

A. Mr. Ferrier had charge of the entire work, as manager.

Q. And you were under Mr. Ferrier?

A. Yes, sir.

(Testimony of Richard A. Sullivan.)

A recess was thereupon taken until two o'clock P. M. [547]

At two o'clock P. M. the hearing was resumed.

[Testimony of Richard A. Sullivan, for Defendant (Recalled).]

RICHARD A. SULLIVAN, a witness heretofore called in behalf of the defendant, and duly sworn, being recalled in behalf of the defendant, testified as follows, to wit:

Direct Examination.

(By Mr. BUDGE.)

Q. Do you desire to make any correction in your testimony, Mr. Sullivan?

A. Why, there may be some little points that I might; yes.

Q. All right; do so.

A. Regarding being one of the locators of the claims on Montpelier Creek, I think I qualified it by stating that I was a locator of a portion of the claims. I will qualify that further. To the best of my recollection, I was simply a locator on the Wizard only.

Q. On any of the claims that are involved here?

A. Of the claims that are involved, yes. That is my recollection now.

Q. I will ask you whether or not at the time you had the conversation with Mr. Duffield and Mr. Jeffs, up in the canyon, or at any other time or place, you stated to them or either of [548] them that you were pleased that they were not intending to make placer locations over the placer locations of these

(Testimony of Richard A. Sullivan.)

locators, the predecessors in interest of the San Francisco Chemical Company?

A. I did not, sir. Any evidence or testimony to the contrary is an absolute falsehood. There was no occasion for it, and it wasn't mentioned.

Q. You didn't express yourself at all as to their making placer locations, or otherwise?

A. Not as to placer locations, no, sir. The lode and the placer contention was the only thing that was discussed, they contending that it was lode, and I placer.

Mr. BUDGE.—I will ask you gentlemen whether it may be stipulated that those conveyances to the San Francisco Chemical Company were made on August 28th, 1906?

Judge DEY.—Go on and state it just as you did awhile ago.

Mr. BUDGE.—It is stipulated and agreed that the deeds of conveyance from the predecessors in interest of the San Francisco Chemical Company to the said San Francisco Chemical Company, of the placer claims involved in this suit, were made on the 28th day of August, 1906, acknowledged September the 13th, I think it was, 1906.

Judge DEY.—Yes.

Mr. BUDGE.—And that said deeds were recorded [549] on the 27th day of July, 1910.

Judge DEY.—All right.

Mr. BUDGE.—I would have that September 13th —acknowledged and delivered September 13th, 1906.

I think that is all by this witness.

(Testimony of Richard A. Sullivan.)

Cross-examination.

(By Mr. JACK.)

Q. Did you inform Mr. Duffield in that conversation whom you represented?

A. As stated before, I am not sure whether I did or not, any more than that we were the owners of the claims that appeared of record at that time.

Q. Did you say that to Mr. Duffield?

A. I don't know that I used that particular language. That was the intent.

Q. How near that language did you use?

A. I couldn't say. I don't remember just what I did tell him in that particular.

Q. You didn't know, as a matter of fact, in whom the legal title was vested at that time?

A. Yes, sir; but I don't remember now, clearly. I said, to the best of my knowledge, I was satisfied that the deeds had been made from the owners to the San Francisco Chemical Company prior to that, but as to the exact date I am not absolutely sure, and therefore I can't testify absolutely upon that point.

Q. Well, what I am getting at is, whether Mr. Duffield [550] knew whom you purported to represent?

A. He had access to the records to find out who were the legal owners of those claims, as they appeared of record. They were public property.

Q. If those deeds for the claims, conveying them to the San Francisco Chemical Company, were made in 1906, and not recorded until 1910, do you know

(Testimony of Richard A. Sullivan.)

whether that was held in escrow under some agreement? A. I don't think so.

Q. You don't think so? A. No, sir.

Q. You know no reason for not recording it prior to 1910? A. I know of none; no, sir.

Q. In speaking of the ledges and the placer locations, in that conversation with Mr. Duffield, did he tell you that he had made ledge locations?

A. I looked over it for my own information. I went over the ground and ascertained the location of it personally.

Q. And was anything said to the effect that you were glad that he had not made placer locations?

A. Absolutely nothing, sir—absolutely nothing.

Mr. JACK.—That's all.

Mr. BUDGE.—That's all. **[551]**

[Testimony of Fred. B. Weeks, for Defendant.]

FRED. B. WEEKS, a witness called in behalf of the defendant, being first duly sworn, testified as follows, to wit:

Direct Examination.

Mr. BUDGE.—Now, Judge Dey, I would like to have the same stipulation which we had with reference to the experts on the other side, apply to this testimony.

Judge DEY.—All right.

Mr. BUDGE.—It is stipulated and agreed that in the cases of Morse S. Duffield and Lewis A. Jeffs, Complainants, vs. the San Francisco Chemical Company, Nos. 568 and 569, pending in the United States

(Testimony of Fred B. Weeks.)

Circuit Court for the District of Wyoming, and in the case of Morse S. Duffield and Lewis A. Jeffs, Complainants, vs. the San Francisco Chemical Company, pending in the Circuit Court for the District of Idaho, that the testimony of F. B. Weeks, C. L. Breger and Robert Bell, witnesses for the defendant, may be taken at the same time, and may be treated and considered as the testimony in each of said cases, with like effect as if the said witnesses had been sworn and examined in said causes separately. This stipulation is made for the purpose of saving time and expense.

Q. What is your name? [552]

A. Fred. B. Weeks.

Q. How old are you, Mr. Weeks? A. 46 years.

Q. Where do you reside?

A. Los Angeles, California.

Q. What is your occupation?

A. Geologist and mining engineer.

Q. How long have you been engaged in the business of a geologist and mining engineer?

A. Since 1890.

Q. And what preparatory work did you have prior to 1890?

A. My early education was obtained in the common schools of New York State; then, in what is known as an academy; and subsequently I took a special course in geology, mineralogy, chemistry, in what is now known as the George Washington University, of Washington, D. C.

Q. And commencing with 1890, what was the na-

(Testimony of Fred B. Weeks.)

ture of your work as a mining engineer and geologist?

A. I was in the employ of the United States Geological Survey from December 1st, 1890, to April, 1908.

Q. What position, if any, did you hold in the Geological Survey during that period?

A. Well, I held various positions, and had various official names; but the work which I was doing was entirely in connection with the geological branch of the Geological Survey.

Q. And in what portions of the country were you employed as a geologist in the Geological Survey?

A. With the exception of some work in New York, Maryland [553] and Kentucky, it has been entirely in the Rocky Mountain and other Western States.

Q. What were your duties as a geologist on the Survey, during the eighteen years that you were on it?

A. My duties were those of examining such portions of the country as I was given instructions to do at various times, as to the character and distribution of various geological formations, the economic productions that were contained in them; occasionally in mapping certain portions to show the distribution of geological formations; and that general work which pertains to geology.

Q. Did you have anything to do with making reports of your investigations?

A. Yes, sir; I made quite a number.

(Testimony of Fred B. Weeks.)

Q. And what kinds of properties and what classes of mining properties were you assigned to investigate from time to time?

A. My examination of mining properties was usually made in connection with geological work in the areas in which these particular mines or properties occurred, and the instructions for field work were not definite as to any particular mine, but included anything of economic importance within the area within which I was working.

Q. Now, for what period of time were you assigned to work or investigate mining properties and geological conditions within the Rocky Mountain States?

A. I think the first year was 1894, and every Summer from that time until 1907, including 1907, I spent some portion of [554] the Summer, varying from one to five months, in field work, in some of the Western States.

Q. And by "Western States" what do you mean?

A. I mean the Rocky Mountain States, from and including Wyoming, Colorado and Montana, west to the Pacific Coast.

Q. Did you at one time occupy the position of Assistant Director of the Survey?

A. No, sir; I never occupied that position. I was the Field Assistant of the Director of the Geological Survey from the time when Director Walcott was appointed, I think it was the year 1903—it was either 1903 or 1904—to the close of his administration, in 1906, I think.

Q. Now, in pursuance of your duties upon the

(Testimony of Fred B. Weeks.)

Geological Survey, what properties, or classes of properties, rather, came under your observations in making these geological investigations?

A. My work included examinations of both lode and placer mining operations, but for the most part was confined to veins or lodes.

Q. And particularly in what States?

A. South Dakota, and Wyoming, Montana, Idaho, Utah, Nevada and California.

Q. Have you examined the lode formations and the placer formations generally throughout these States you have named?

A. Well, I can only say that in the areas where I have been at work, I have examined quite a good many. Of course, there are many parts of the States named that I have never visited. [555]

Q. Calling your attention to the Plaintiff's Exhibit 1, I will ask you whether or not you are familiar with the deposits of calcium phosphate in the group of claims shown on that exhibit? A. I am.

Q. And when, Mr. Weeks, did you first become interested in the investigation of phosphate deposits in the United States?

A. Well, I might say that I first began the study of phosphates from the literature of the subject in about 1892, and that I read practically all the papers that were published on the phosphates of the United States from that time to the present. My actual field work—my examination of phosphate deposits—began in the fall of 1906.

Q. What literature, Mr. Weeks, have you read,

(Testimony of Fred B. Weeks.)

that you now call to mind, as covering the treatment of the phosphate deposits—that is, that treated of the phosphate deposits?

A. Well, Wyatt's book on The Phosphates of North America is one of the most comprehensive treatises on the subject. The publication by Penrose and Shaler, which was published as a bulletin of the U. S. Geological Survey, gave a *résumé* of what was known at that time as to the phosphate deposits of the world, and particularly as to the phosphates of North and South Carolina, Alabama, and Florida. The publications of Eldredge, who examined the Florida phosphates for the U. S. Geological Survey. The publications of Hayes, who examined and reported upon the phosphates of Tennessee. The reports upon the phosphates of Arkansas—I can't speak the man's name at the present time. I can refresh my memory from one of those pamphlets [556] if you wish that name.

Q. Have you read the treatment of the subject by Mr. Bryner?

A. Yes, sir; that was on the deposits of Arkansas. also, by Professor J. C. Bryner. But the one I have reference to is in the Report of 1907.

Q. Calling your attention to Bulletin 436, by George H. Gerty; have you read that?

A. Yes, I have read that. I have also read the report of Gale and Richards upon these western phosphates, and one of the bulletins of the Agricultural Department by Waggaman. I might explain my knowledge of the literature a little further by say-

(Testimony of Fred B. Weeks.)

ing that from 1892 to 1907 I prepared and published annually for the Geological Survey a bulletin called The Bibliography and Index of North American Geology, Paleontology, Petrology and Mineralogy; that each year this compromised an average of about 1200 different articles, a large number of which I read entirely, and all of which I went through for the purpose of indexing them for this publication, and in that way I became very familiar and conversant with all geological work that was going on in the United States. Those publications made about fifteen volumes.

Q. And that was a part of your work?

A. That was a part of my official work as a geologist on the Geological Survey.

Q. And during what periods?

A. From 1902 to 1906 or 1907—I think it was 1907, the last one.

Q. Now, coming to the field work which you did on the Geological [557] Survey, investigating the phosphate rock deposits; when did you say that commenced? A. In the fall of 1906.

Q. And what part of the field did you cover during that time, or at that time?

A. The phosphate ground as it is shown on Exhibit 1, and the phosphate on Thomas's Fork, or rather, Raymond Canyon, in Wyoming and at Cokeville, Wyoming.

Q. Just a minute, Mr. Weeks. The phosphate deposit that you referred to in Raymond Canyon, I will ask you whether that is the deposit that is shown on

(Testimony of Fred B. Weeks.)

Plaintiff's Exhibit "B," J. W. C.—that is the endorsement—and which is covered by the Frances placer mining claim and the Freyerson lode mining claim? A. Yes, sir.

Q. And also the deposit embraced within the Raymond placer mining claim, and the Japan and China lode mining claims? A. Yes, sir.

Q. As shown on "Plaintiff's Exhibit 'A,' J. W. C."? A. Yes, sir.

Q. And these are at Raymond Canyon?

A. Yes, sir, in that vicinity.

Q. In the State of Wyoming? A. Yes, sir.

Q. All right. Proceed, Mr. Weeks, and tell us what other ground was covered by you.

A. I think that was all the ground I covered in 1906.

Q. All right. Where next? [558]

A. In 1907 I examined the deposits east of Ogden, near Devil's Slide; those on Twelve Mile Creek, west of Woodruff; I re-visited the Cokeville area, and the Raymond Canyon area; also examined the deposits at what is known as Hot Springs, on the east side of Bear Lake, and spent considerable time on the deposits at Montpelier; then those in Georgetown Canyon, west of Georgetown, Idaho, and in the area of what is known as Swan Lake, and the mountains directly east of Soda Springs, Idaho.

Q. Did you visit the Crawford Mountain country?

A. I omitted the Crawford Mountain country. I examined also the phosphate beds throughout their whole extent of the Crawford Mountains.

(Testimony of Fred B. Weeks.)

Judge DEY.—In what year?

A. In 1907; and also in the hills two or three miles west of Sage, Wyoming, which are an equivalent extension of the Crawford Mountains.

Q. Now, in 1908 what field did you visit?

A. In the summer of 1908 I went to Cheyenne, Wyoming, and in the Rocky Mountains about 15 or 20 miles North of Cheyenne I found this phosphate horizon. Then, I went to Laramie, Wyoming, and in the mountains two or three miles west of Laramie, Wyoming, I found the phosphate horizon; and then west of Laramie, in the central part of the State, on the line of the Union Pacific—I can't recall the name of the station now—but about three miles west of that station I found the phosphate horizon. I can't recall that name just now. Then, I made a short trip into Western Montana, but I didn't find the phosphate horizon there—that is, what I was looking for. I think that was all the work I did in 1908. **[559]**

Q. In 1908? A. Yes, sir.

Q. Now, in 1909 did you do any work in the field for the Geological Survey?

A. No; I wasn't in the Geological Survey during 1909.

Q. Not during 1909? A. No.

Q. When did you end your service in the Geological Survey?

A. I think it was April, 1908—

Q. So a portion of the work that you did in 1908—

A. —was simply my own personal investigation of the subject.

(Testimony of Fred B. Weeks.)

Q. Did you make a report on the phosphate deposits near Montpelier, and which was published as a bulletin of the Geological Survey in 1907?

A. That was a part of the report.

Q. Covering phosphates?

A. My report for 1906 covered the area which I stated I had worked in in 1906; that covered the Montpelier, and the property that is now in question here.

Q. And the publication to which I have referred was a part, you say, of the report?

A. That was the report—the publication.

Q. Bulletin No. 340, so called? A. Yes.

Q. And under the title of "Contributions to Economic Geology"? [560] A. Yes, sir.

Q. Now, Mr. Weeks, are there any other areas of this phosphate deposit which you have personally visited and investigated, other than those you have described and named?

A. I think I omitted to state that in the summer of 1908 I found the phosphate horizon east and southeast of Salt Lake City, about from two to five miles.

Q. Five miles?

A. From two to five miles; one locality is about two miles east, and the other about five miles to the southeast. I don't recall now that I have done any other field work in any other area.

Q. At what other times other than you have mentioned have you visited and investigated and inspected the phosphate deposits comprised within the boundaries of these placer claims shown on Plaintiff's

(Testimony of Fred B. Weeks.)

Exhibits 1, "A," and "B"?

A. I don't recall the dates of any other work, except what I have done in connection with this suit. I have been at Montpelier a good many times, and have been up on this ground quite a good many times, at other times than I have actually mentioned. I don't remember the exact times. And at such times, of course, I made observations, more or less.

Q. Now, are there any other phosphate areas of which you have information from the work of other geologists, other than the areas that you have described, which you have not personally visited?

A. I don't recall of any except those that I named where I had read the reports, in regard to Tennessee and Arkansas, and the Florida and South Carolina deposits. [561]

Q. But I am speaking of the phosphate deposits of the West. Calling your attention particularly to the region of Gray's Lake; have you visited that particular country? A. No, sir.

Q. And have not investigated the deposits there?

A. No, sir.

Q. Well, I will ask you if there are deposits, as shown from the publications of the Geological Survey, in that section? A. Yes, sir.

Q. Now, are there any similar deposits which you have not visited, but which have been ascertained to exist, by the Geological Survey?

A. There is one in Western Montana, and there are others in Idaho and Wyoming, of which I have knowledge from conversations with the geologists of

(Testimony of Fred B. Weeks.)
the Survey who have studied those regions.

Judge DEY.—I move to strike that out, as improper and incompetent—a conversation.

Q. You know of them, however, from the publications of the Geological Survey, and from your investigations of them?

A. In so far as they have been published by the Survey, I know of them.

(A map marked Defendant's Exhibit 1 was placed upon an easel.)

Q. Calling your attention, Mr. Weeks, to Defendant's Exhibit 1, did you prepare that exhibit?

A. I did. [562]

Q. And what does it represent?

A. As stated on the legend on the map, the base of the map is from the maps of the United States Land Office.

Q. What do you mean by "base of the map"?

A. That is, in starting I took from the Land Office maps of Idaho and Wyoming and Utah, commencing with certain townships and certain ranges, and drawing in light lead pencil, marked the various townships on a scale of one inch to three miles, taken from those maps; then upon that I platted from those maps the streams and the railroads, the locations of the towns, and of Bear Lake, Gray's Lake, and that was practically all the material I took from the Land Office maps. The colored portion of the map, which the legend shows is upper carboniferous strata, black lines, indicates position of phosphate series, arrows indicate direction of dips.

(Testimony of Fred B. Weeks.)

Judge DEY.—What is that last?

A. Arrows indicate direction of dips. Areas not marked—that is, not colored,—contain strata older or younger than upper carboniferous. The geology that I placed on there as the upper carboniferous, and the location of the position of the phosphate series, is based upon my own field work, with the exception of the area near the head of the Ogden River, and of the area which is shown between Gray's Lake and Blackfoot River.

Judge DEY.—Just point to that.

(The witness did so.)

A. Those two areas were platted upon this map from publications of the Geological Survey. All the others are based upon my own observations. [563]

Q. Does the colored portion of the map—the green colored portion of the map—purport to represent the upper carboniferous strata that is exposed?

A. That is exposed at the surface. Of course, it underlies a great deal of that country where it is covered by later rocks; but the areas shown there are the areas upon which it appears at the surface.

Q. Now, recurring to your examination of these various areas at the times you have mentioned, I will ask you whether or not the deposit—the phosphate rock which you found at these various—in these various fields, from the Weber River deposit, north to the Soda Springs district, whether they are similar in texture and in manner of occurrence?

A. They are very similar in all their characteristics.

(Testimony of Fred B. Weeks.)

Q. Throughout the whole area?

A. Throughout the whole area.

Q. You may describe, Mr. Weeks, as a geologist, the manner in which this formation was brought about—I mean the formation of this phosphate deposit.

Judge DEY.—That is objected to as wholly immaterial, for the reason that the question of the origin of how it was originally brought about has no bearing on the determination of the question of whether it exists in the form of a lode or placer.

Mr. JACK.—Let that objection go to all this class of testimony.

Mr. BUDGE.—Oh, yes. [564]

Judge DEY.—Why, I believe that is so understood.

Mr. BUDGE.—Yes. All right. Go ahead, Mr. Weeks.

A. The beds, which are formed of calcium phosphate, are a part of a series of sedimentary deposits that are several thousand feet thick. The beds, or bed, which immediately underlies the lowest stratum of phosphate rock is a silicious limestone. This was formed as all—in the same general way as limestones that are formed in the bed of the ocean; and the lowest phosphate layer was laid down or deposited immediately upon this limestone. This lowest phosphate bed is a two-foot layer of fossiliferous limestone, and succeeding immediately above are other layers of phosphate and shale and limestone. So that we have what is called the phosphate series, beginning at the top of the silicious limestone, and continuing

(Testimony of Fred B. Weeks.)

up through a thickness of from 60 to 200 feet, of these alternating beds of phosphate and limestone and shale, to a series of cherty limestones of considerable thickness, which overlie the phosphate series. The conditions of sedimentation, which began with the deposit of the lower bed, and continuing with its variations through this thickness of 40 to 200 feet, was ended at the beginning of the formation of this overlying cherty limestone. Those conditions of sedimentation prevailed over the area shown upon Defendant's Exhibit 1, so that while there are variations in the thickness of this series, and in the relations of a shale bed to a phosphate bed, or to a limestone, yet as a whole they were very similar throughout that whole area.

Q. What have you to say as to the texture of this phosphate [565] rock?

A. The rock is granular in its character, or, more technically, composed of oolites, which are rather loosely cemented together, and there is almost always a comparatively small amount of cemented material, the oolites forming a very large proportion of the rock mass.

Q. And from your study of geology, what is the manner in which oolites are formed?

A. When you examine the phosphate rock in a hand specimen, the first examination one makes of its granular character it seems to be made up of grains, which are these little oolites; and if you take a piece of this phosphate rock and grind it down until it is very thin and spread it out upon a sheet of

(Testimony of Fred B. Weeks.)

glass, and grind it so that you get cross-sections of these oolites, so that you can observe through the microscope the internal structure of these oolites, you will find that they are made up of concentric layers of I might call them concretions; they are layers of material, one layer upon another, of course exceedingly thin, and you will find in the center of those oolites frequently a small particle of calcite, which is shown by the striations of the calcite material, forming the nucleus around which these materials have accumulated forming the oolite; or you will find in the center of the oolite another oolite, which shows under the microscope to have been broken in two, and its edges made rough, as if it had been rolled around upon something. Such a piece of broken oolite forms the center, or the nucleus of the subsequent oolite which is formed, which you find forming these concentric forms or layers. So that the study of these oolites indicates from their structure, and from the [566] material of which they are made, that they were formed upon the ocean bottom, in which the water must have been comparatively quiet; nevertheless, there was sufficient movement of the water, or currents, to move these oolites along, to abrade them, and in that movement they were gathering from the surface underneath the water, or from material in suspension in the water, the materials which formed the oolites. They were the first things that were formed in this phosphate rock. The cementing material, which is the calcium carbonate, was probably laid down in a form just about the same time

(Testimony of Fred B. Weeks.)

that the oolites were formed, or immediately thereafter, and the whole mass of the phosphate rock is made up of these oolites, and of the calcium carbonate cement, which binds the oolites together into a rock stratum.

Q. Are oolites formed in any other manner than by the movement of water, or the contact with water?

A. I cannot conceive of any other process of how they could have been formed other than that.

Q. And I will ask you whether, from a geological standpoint, whether it would be possible for the oolites to have been formed after the consolidation of them, or the cementing process had taken place?

A. From my study of the rock in the field, and from these microscopic studies which I have just described, it seems to me that the phosphate rock was formed grain upon grain—grain after grain—until the whole thickness—until the sedimentation—the conditions of sedimentation changed, so that oolites were no longer formed, and that it was a rock mass, [**567**] in its present form and constitution, at the time those conditions changed, and the sedimentation of the overlying limestone began. So that I have never discovered any evidence to indicate that there has been any other material added to the bed of phosphate rock since it was formed in that way.

Q. Now, after its formation in the way in which you have described, by the aggregation of oolites and this cementing material, it was after that that it became solidified? A. Undoubtedly.

Q. Now, in the process of solidification, or in the

(Testimony of Fred B. Weeks.)

process of this bed becoming solid, is there any way in which the oolites might have been formed in that process?

A. I don't think it would have been possible.

Q. What other evidence have you discovered from your investigations of these deposits, that they are of—that the deposition of them was in water, or that it is a marine deposition?

A. The limestone which immediately underlies the lowest bed of phosphate is a fossiliferous limestone, containing shells that grew and developed in marine waters. The two-foot bed of limestone which I have mentioned as overlying the lower phosphate bed also contains many marine fossil shells, and the other layers of phosphate and lime and shale that comprise the phosphate series are each and every one of them fossiliferous; that is, they contain shells of marine origin; and the limestones—the cherty limestones which I have mentioned, which overlies the whole phosphate series, is also very fossiliferous, containing numerous marine shells. Those conditions prove beyond any [568] question that those beds were sedimentary, and that they were laid down in the bed of an ocean.

Q. Are those fossils in evidence just occasionally, or do they abound in this deposit?

A. Oh, they are very abundant throughout the phosphate series, and also in the limestones above and below the phosphate series.

Q. What condition have you observed as to these fossils at the plane which separates the phosphate

(Testimony of Fred B. Weeks.)

bed from the layer of limestone that is immediately above the lower phosphate bed?

A. The limestone bed that immediately overlies the lower phosphate bed contains a great number of fossils, especially of two species of the genus omphalatrochus. These two species that I mention are very abundant throughout this limestone—very characteristic limestone. They have never been found in this western area to my knowledge in any other layer of limestone, and in a great many places you will find them so abundant in this layer of limestone that there will be very little material between them, and the line between the top of this phosphate bed and the bottom of this fossiliferous limestone is very clear and distinct, and in many of the open cuts and tunnels where this bed is exposed, this bed of limestone is exposed so that you see the lower edge, or side rather, of the mountain, you will see these fossils sticking out in great numbers, so that if you break away the phosphate from the limestone you see that the phosphate is lying right up against the limestone, and against these fossils, which are so very numerous.

Q. Now, are those fossils the fossils which are treated in the pamphlet by Mr. Gerty? [569]

A. Yes, sir, they are described in that pamphlet.

Q. Described in the treatment of what is known as The Fauna of the Phosphate Beds?

A. Yes, sir.

Q. Of the Park City formation? A. Yes, sir.

Q. What is meant by that Park City formation?

(Testimony of Fred B. Weeks.)

A. In describing the sedimentary formations that make up the crust of the earth, the geologist makes certain divisions of them, usually according to variations in their lithological characters, and to those divisions we give names, and those names are generally from some place where that division is well exposed. The division which contains this phosphate series is well exposed at Park City, Utah, and in connection with the work of the Geological Survey at that point they have described and named the formation as the Park City formation. That formation in this area contains the phosphate series.

Q. Calling your attention to these deposits as they appear in the claims referred to or set forth and described in Plaintiff's Exhibit 1, and in Plaintiff's Exhibit "A" and "B," you may give us a description of the manner in which these beds occur within these areas.

A. They occur as a part of the sedimentary strata which are exposed in the mountains—the Preuss Mountains, and the Sublette Mountains—

Q. Where are the Preuss Mountains, Mr. Weeks — A. The Preuss Mountains extend—

Q. —with reference to Montpelier? **[570]**

A. Directly east.

Q. And the Sublette?

A. They are still farther east, and a little south, in Wyoming.

Q. Yes—all right.

A. These beds, which were originally deposited in a horizontal form, are now standing at dips in

(Testimony of Fred B. Weeks.)

these two areas of which I am speaking particularly, ranging from 10° to nearly vertical. They occur between the—or rather, they form a part of the great series of strata which preceded and succeeded the formation of the phosphate series.

Q. Yes. How does the dip conform to the slope of the hills in which the deposit is found upon these claims; is it the same or different?

A. Well, it varies from place to place. In some places the dip of the bed conforms quite closely to that of the slope of the surface; in other places the dip of the bed is very much steeper than the slope.

Q. Have you examined the workings upon these various claims? A. I have.

Q. On what claims? On all the claims—the Wilmington, Colcock, The Inman, Winter, Wonder, Winslow and Wizard claims?

A. I think I have examined every opening that has been made upon the lower phosphate bed within those claims?

Q. And the Waterloo? A. Yes, sir.

Q. And are you familiar with the boundary lines and corners [571] of the lode claims of the complainants, named on this Exhibit 1—the Obey, Obed, etc.?

Judge DEY.—Call that plaintiff's.

Mr. BUDGE.—Plaintiff's Exhibit 1. Yes, sir; pardon me.

Judge DEY.—Yes.

A. I have been to a great number of their posts. I am familiar with their location.

(Testimony of Fred B. Weeks.)

Q. With the shape of the claims, and with the boundary lines thereof? A. Yes, sir.

Mr. BUDGE.—For purposes of illustration, we offer in evidence Defendant's Exhibit 2, showing the extent of the deposit and the approximate location of it, throughout the area shown on that exhibit.

Said map was marked Defendant's Exhibit 2.

Q. Calling your attention to Defendant's Exhibit 2, did you prepare that map, Mr. Weeks?

A. I did. I prepared the map from which that is made. That is a photograph of the map I made.

Q. And the map you made, in what manner did you make it?

A. The Plaintiff's Exhibit 1, I had a blue-print made of that exhibit, and then upon that blue-print I put on all the other features that are on this Defendant's Exhibit 1—

Q. Exhibit 2.

A. Exhibit 2; and then a tracing was made on linen of that blue-print, and a negative made of that tracing; and this Defendant's Exhibit 2 is a print of that negative. [572]

Q. So far, then, as the boundary lines of the various placer and lode claims are concerned, this is identical with Plaintiff's Exhibit 1? A. Yes, sir.

Q. And as showing also the tunnels and cuts and other workings, such as stripping, etc., which are shown on the Plaintiff's Exhibit 1?

A. Yes, sir.

Q. And are there any other features upon this exhibit which do not appear upon the Plaintiff's

(Testimony of Fred B. Weeks.)

Exhibit 1—any other markings?

A. Yes, sir, there are a number of things that I have put upon there.

Q. Well, describe them, and explain them, please.

A. In the first place, with the blue-print of Plaintiff's Exhibit 1 in hand, I went upon the ground, and beginning at the Waterloo mine, or the Waterloo placer, I followed the outcrop of the lower phosphate bed and noted its position upon this blue-print. That is indicated by the heavy black line, the legend on this exhibit stating: "Heavy black line indicates position of main phosphate bed, as shown by tunnels, open cuts and natural exposures." As I said, with this blue-print in hand, starting from the Waterloo mine, I proceeded along the outcrop, a very natural outcrop, to the various open cuts and tunnels that were made all along upon it from that point to the point where it passes underneath the surface, near the westerly end of the Tennessee lode. The outcrop again begins on the other side of the gulch—on the north side of the gulch—directly north from the Tennessee lode. **[573]**

Q. Well, just a minute. Yes, that is north, isn't it?

A. Yes—and I followed the lower phosphate bed to and through the Arkansas lode and upon the Winslow placer, through the Mount Pleasant lode, as shown upon Defendant's Exhibit 2, the point where it passes underneath the surface, on the southwest end of the Mount Pleasant lode. I began again on the opposite side of Montpelier Creek Canyon, near

(Testimony of Fred B. Weeks.)

the southwest end of the Overton lode, and followed the bed through the Overton, Cumberland, Fentress, Jimtown, Obed and Obey lodes, and examined the tunnels marked 1 and 2 of the Obey lode. I then followed the bed up the slope of the ridge to the point which is marked 70 ft. tunnel on the Wilmington placer. From there I proceeded in a general southerly direction along the slope of this ridge, the bed being shown by numerous open cuts, to a point on where the bed crosses the ridge and takes a generally—the outcrop takes a general northerly direction. This was shown by some natural exposures and by open cuts to extend to and beyond the point marked B on the Wilmington placer. At the time I examined the outcrops upon the Arkansas lode and Mount Pleasant and Overton lodes, I made an examination of the phosphate series and of the beds underlying and overlying the series, for the purpose of making the cross section, which is noted as C D upon Defendant's Exhibit 2, which extends from the point C on the north side of the Wizard placer, to the point D on the west side of the Montpelier Creek, within the Winslow placer.

Q. Do you mean the north side of the Wizard placer, or the east side?

A. I mean the east side of the Wizard placer—the east side of the Wizard placer. I also— [574]

Q. Just tell us what this cross-section shows, Mr. Weeks.

Judge DEY.—Where is it?

(The witness indicated upon said exhibit.)

(Testimony of Fred B. Weeks.)

A. That is the cross-section.

Q. That is cross-section C D, so designated?

A. The cross-section C D shows the point of outcrop of the lower phosphate bed upon the Arkansas lode, and extending through and underneath the hill or ridge, through the tunnel marked 34 on the Mount Pleasant lode, where the phosphate bed again comes to the surface and outcrops. From the tunnel 34 in the Mount Pleasant lode, along the line of the section across Montpelier Canyon Creek, to the point where the position of the lower phosphate bed is shown on the Overton lode, the phosphate bed and all the strata above it, and those below it down to the creek, have been eroded, and that is shown on the cross-section C D by the statement "Phosphate Series eroded." From the point on the west side of Montpelier Creek the position of the outcrop of the bed, to the point D, the phosphate bed dips to the west into the hills. This section shows that from the outcrop of this lower phosphate bed on the Arkansas lode it dips to the west underneath the hill through the tunnel 34.

Q. On what claim?

A. On the Mount Pleasant lode. The strata which are marked on the section C D as underlying silicious limestones, are shown in natural exposures on the Mount Pleasant lode on the slope leading down to Montpelier Canyon Creek, and also in part are shown on the Overton lode on the slope going up the ridge to the west. [575]

Q. Will you explain to us the section A B which

(Testimony of Fred B. Weeks.)
you have on this map?

A. The section marked A B shows the cross-section from the point A, on the west line of the Obey lode, to the point B, within the Wilmington placer. This section shows that from tunnel 4 of the Obey lode, the lower phosphate bed, and the overlying and underlying strata as well, dips to the west at an angle of 20°. From tunnel 4 of the Obey lode to the tunnel marked 70 ft. tunnel on the Wilmington placer, the entire phosphate series, as well as a portion of the underlying limestone, has been eroded by Gertch Hollow. From the point on section A B marked tunnel 70 ft. in phosphate bed, to the end of the section, at the point B, within the Wilmington placer, the section shows the occurrence of the phosphate series underneath the ridge, with the overlying chert limestone. This section shows that the phosphate series, beginning from the point B, dips to the west, and extends through to the 70 foot tunnel, and from that point to tunnel No. 4 the Obey lode is eroded by Gertch Hollow. From tunnel 4 of the Obey lode to the end of the section at A, the phosphate bed and overlying strata are dipping to the west into the ridge. On the Waterloo placer, from the point marked E to F, I made another section, showing the position of the lower phosphate bed, and I have also noted upon Defendant's Exhibit 2 the lower and upper tunnels of the Waterloo mine, with two raises therein, and the point where this section cut through the mine. As shown by the legend, the arrows which I have placed upon

(Testimony of Fred B. Weeks.)

here, with the figures attached thereto, shows the dip of this lower phosphate bed at the position [576] of the arrows, and the direction of the point of the arrows.

Judge DEY.—What are the figures?

WITNESS.—Well, they vary from place to place.

Judge DEY.—Well, what do they indicate?

WITNESS.—They indicate the dip—the degree of the dip. For instance, above the Waterloo mine the dip marked here is 24°.

Q. Now, Mr. Weeks, commencing at the Wayne lode, or at the south end of the Wizard placer, and tracing the deposit as you have it marked by the black line, and as indicated on Defendant's Exhibit 2, you may describe the manner in which this deposit occurs, and the manner in which it is exposed.

A. This lower phosphate bed has a dip to the west, varying from 12° to 35°, and a north and south strike. The strike of the bed is always at right angles to the dip, and in places there are slight changes in the dip, so that there are slight changes in the strike; but as a general proposition the series throughout the whole extent of this area shown on Defendant's Exhibit 2 has a westerly dip and a north and south strike.

Q. Now, how does the exposure of the phosphate rock, as shown on this exhibit, conform—how nearly does it conform to the strike of the deposit?

A. As I have stated, the heavy black line indicates the position at the surface of the lower phosphate bed; so that, as can be seen on this exhibit, it is in a

(Testimony of Fred B. Weeks.)

very irregular line; while the strike of the bed is essentially north and south everywhere, [577] the strike of the bed being always at right angles to its dip.

Q. What is the cause of the irregularity of the exposure? To what physical condition is it due?

A. It is entirely due to the difference in the dip of the bed, but it is in a much greater degree the erosion of the surface of this mountain slope, which causes the outcrop, the exposure of this phosphate bed, to be so irregular.

Q. So that, standing upon the ground, or at the point where the phosphate rock is exposed on the Arkansas lode claim, or within the Wizard placer, and looking toward Montpelier Creek, down the hill, the irregularity of the line of exposure is due, is it or is it not, to erosion?

A. It is due to the erosion.

Q. Yes, at the various points where these lines curve and are angular?

A. It is due to erosion of the surface.

Q. Take, for example, the place here indicated on the map as a gulch, which proceeds from the point where the figures 1494—what is that—6/10ths?

A. Yes.

Q. —1494.6, where it is shown that the gulch runs from where those figures are, up to the corner posts of the Mount Pleasant and Arkansas lodes claims. I will ask you whether or not it is apparent from the physical conditions there that the phosphate deposit up that gulch has been eroded, and left

(Testimony of Fred B. Weeks.)

the outcrop of the deposit lower down in the gulch than it would otherwise have been except for erosion?

(No answer.) [578]

Q. Can you explain that condition there?

Mr. JACK.—I would like to have the question read.

(Said question was repeated.)

A. That is true, that it is shown by the physical conditions, for the reason that on the north side of this gulch, and just to the north of the figures 823.9, the limestones which are immediately underlying the lower phosphate bed are exposed upon the surface, and if the phosphate bed had not been eroded from this region the outcrop of the bed would have extended up through the area which I am trying to locate.

Q. And the outcrop, or the bed of phosphate rock, would likewise have been one continuous bed across what is now the channel of Montpelier Creek, had it not been for the erosion? A. Yes, sir.

Q. And that is true also of the gulch here along the Tennessee lode claim, where the bed has been taken out by reason of erosion? A. Yes, sir.

Q. And the irregularity of the outcrop in all these places, as well as a great many others shown on this map, is due to the erosion of the surface, and also to the erosion of the bed of phosphate rock?

A. Yes, sir.

Q. Now, what did you find the condition to be as to erosion along the side of the hill? You may explain to us how you found the conditions along the

(Testimony of Fred B. Weeks.)

side of the hill, where erosion has taken place by drainage down these different gulches, as it [579] affects the phosphate bed?

A. Well, as shown on Exhibit 2, in the two gulches which are shown on the Mount Pleasant lode the outcrop of the bed extends up the opening or cut of the gulch.

Q. Now, did you find, in making this investigation as to the line of exposure of this phosphate deposit, that the deposit went without the boundary lines, or was exposed without the boundary lines of the lode claims shown on Defendant's Exhibit 2 and on Plaintiff's Exhibit 1?

A. On the Defendant's Exhibit 2 it goes outside of the lode claims in all the places where this black line is shown to extend beyond the limits of those lodes.

Q. You may explain and specify the particular points at which you found the phosphate deposit exposed outside of the lode claims shown on the exhibit.

A. At post 5 on the Maury lode, 19 feet east from the post 5, there is an exposure of the phosphate bed, and from that point along this curved black line to post 2 of the Maury lode the position of the lower phosphate bed is indicated by the outcrop of the underlying limestone on the slope above it, and the phosphate float extending over the surface to the west of this curved line.

Mr. JACK.—The Maury and Tennessee lodes are not involved in this suit, Mr. Weeks?

Mr. BUDGE.—No, they are not.

A. Passing to the Hickman, the phosphate bed is exposed in an open cut a few feet north of the post

(Testimony of Fred B. Weeks.)

No. 10 of the Hickman.

Q. Where is that? [580]

(The witness indicated upon said exhibit.)

Q. Yes—all right.

A. From that point the outcrop beds a little to the southeast, and that outcrop is shown by outcrops upon the surface of the phosphate bed around and above post 5 of the Hickman, and down the slope to tunnel 48 on the Hickman lode, the lower phosphate bed extending without the boundaries of the Hickman lode as shown by this black line on Defendant's Exhibit 2. Do you care for this? (Indicating upon exhibit.)

Q. Yes, I believe I will have you explain that also, with reference to the Tennessee lode, Mr. Weeks.

A. From tunnel 48, which is at or near the discovery point of the Hickman lode, the phosphate bed extends to the north, and is exposed in tunnel 47. Before reaching post 6 of the Tennessee lode the limestone which underlies the main phosphate bed is exposed, and the position of this lower phosphate bed curves, and is shown to the south of the Tennessee lode in various shallow pits or shafts. And I will state further that the position of the phosphate bed to the south of the Tennessee lode is shown by outcrops also of the underlying limestone within the boundary of the Tennessee lode itself. The lower phosphate bed is also shown in the tunnels 41 and 42, and at the discovery on the Tennessee lode.

Mr. JACK.—Within what placer would that be, Mr. Weeks?

(Testimony of Fred B. Weeks.)

A. That would be on the Waterloo. The next point where the phosphate bed extends without the boundaries of the lode claims is on the southeast end of the Mount Pleasant lode. This [581] is shown by several open cuts, which are marked on this black line—two cuts within the bounds of the Mount Pleasant lode and five cuts without the Mount Pleasant lode.

Q. I think you said the southeast instead of the northeast.

A. Yes; I should have said that this phosphate bed extends to the northeast of the Mount Pleasant lode, instead of the southeast. The outcrop of the bed is a curved line, as shown on Defendant's Exhibit 2, and bends around and takes a direction to the southwest, and the position of the bed is shown in three cuts above the northeast end of the Mount Pleasant lode. The lower phosphate bed is shown in tunnels 1 and 2 of the Obey lode. It extends up the hill to the point marked 70 ft. tunnel on the Wilmington placer, and is shown by either natural exposures or open cuts. From this point, the 70 ft. tunnel on the Wilmington placer, the bed changes. The outcrop of the bed changes its direction to approximately south, and is shown in several open cuts, some of which are noted on this Defendant's Exhibit 2, to a point on the ridge where the direction again changes and takes a northerly direction, the position of the bed being shown in various open cuts, and also at the tunnel marked B on the Wilmington placer.

Q. By way of a summary, on how many of the placer claims as shown on the Defendant's Exhibit 2

(Testimony of Fred B. Weeks.)

is the phosphate outcrop shown outside of the boundary lines of the lode claims?

A. It is shown outside of the boundary lines of the lode claims on the Wizard placer, the Winslow placer, the Winfield placer, the Colcock placer, and also the Wilmington placer.

Q. Calling your attention to this particular portion of [582] the bed—phosphate rock—the outcrop of which is shown by the black line, commencing on the south end of the Mount Pleasant lode, and extending around through the Wizard placer and into the Arkansas and back to the southeast corner of the Mount Pleasant, or near that corner, I will ask you to state whether or not that is the particular portion of the bed that is left—that has not been eroded away.

A. The portion within the inside of that black line is the phosphate bed that still remains.

Q. And in all other points below that down to the creek-bed; that is, all below the black line and on the Mount Pleasant lode, down to the creek line, is eroded away? A. Yes, sir.

Q. And is there any phosphate deposit at all on the Mount Pleasant lode claim other than the mere outcrop—lower outcrop of this bed, which has its dip from the Arkansas lode down to that point?

A. That is all.

Q. And below that—that is, the outcrop of the phosphate as it is shown by this line on the Mount Pleasant, is simply—is the lowest point on the Mount Pleasant lode at which phosphate occurs?

A. That is true. All of the area of the Mount

(Testimony of Fred B. Weeks.)

Pleasant lode lying to the west or northwest of the black line, the phosphate series has been entirely eroded, so that there is none there.

Q. And where on the dip does the phosphate series next appear in evidence, after this lowest point on the Mount Pleasant lode? [583] Where does it appear on the dip?

A. Well, it appears on the dip in the openings on the north end of the Wizard placer, and also upon the Arkansas lode.

Q. Yes; but I am asking about, having in mind the point where it outcrops on the Mount Pleasant, on the dip down the hill from the Arkansas, now still continuing on the dip of the bed where does it next—where is it next exposed below the Mount Pleasant lode?

A. It is shown on the Overton lode as a black line running through the Overton lode.

Q. That is the course of the creek?

A. On the west side of the creek.

Q. And all the phosphate series that were at one time within that creek-bed, together with the limestones on either side, have been eroded by that creek-bed? A. Yes, sir.

Mr. JACK.—Did I understand him to say that the Arkansas has the upper outcrop?

Mr. BUDGE.—Yes.

Mr. JACK.—And the Mount Pleasant has a lower outcrop of the same body?

WITNESS.—Yes, sir.

Judge DEY.—I guess that's true.

WITNESS.—Yes, sir.

(Testimony of Fred B. Weeks.)

Judge DEY.—If there is a double outcrop, I guess that's right.

Mr. BUDGE.—How's that?

Judge DEY.—I guess that's right. [584]

WITNESS.—You don't doubt it, do you?

Judge DEY.—No.

Q. The only direction that can be taken, then, following the deposit of phosphate rock on the Mount Pleasant, is upward toward the Arkansas?

A. Yes, sir.

Mr. BUDGE.—Now we offer at this time Defendant's Exhibit 2 in evidence.

Q. On the east side of the creek—Montpelier Creek—(which area on the east side embraces the Mount Pleasant, Arkansas, Hickman, and these other lode claims, and the Wizard and a portion of the Winslow placer)—well, you may call it the south side of the creek—the southerly side—wherever these lines—this line which you have drawn—shows the exposure of the phosphate, makes a curve to the west; it is simply where the land or the hills at that point are lower; and where the curves come up to the east the ground is higher? Is that it?

A. Yes, sir.

Q. And that wherever these curves to the east are shown, or angles are shown, it is where the phosphate bed has been eroded down to the point where the angle is made?

A. You mean to the west, instead of the east?

Q. I mean to the west.

A. Yes, sir; that's right.

Q. In other words, the bed as shown on this Ex-

(Testimony of Fred B. Weeks.)
hibit 2 is one into which inroads have been made by erosion, as shown by these different angles?

A. Yes, sir.

Q. Now, Mr. Weeks, what is the distance which this bed is [585] known to extend on its dip from the outcrop—the greatest distance which it is known, from the geological investigations made by the Geological Survey—in any of this area which has been examined by the Government?

A. In the winter of 1908 and 1909 a hearing was had in Washington, and Mr. George Otis Smith, the Director of the Geological Survey,—

Judge DEY.—You don't mean that, do you, Mr. Budge?

Mr. BUDGE.—No.

Q. I just want to know, Mr. Weeks, if you can tell us, from your study and reading and investigation of these deposits, what is known to be the extent of the deposit on its dip?

A. I was starting to give the authority for the statement that I was making.

Q. Well, just state what you know from your study of the subject. A. Eight miles.

Q. Eight miles? A. Yes, sir.

Q. And at what point was that?

A. It is stated to be at Rock Creek, a point five or six miles east of Sage, Wyoming.

(Another map, marked Defendant's Exhibit 3, was placed on the easel.)

Q. Calling your attention to Defendant's Exhibit 3, I will ask you if you prepared that map?

A. I did. [586]

(Testimony of Fred B. Weeks.)

Q. And what does it represent, Mr. Weeks?

A. It represents a section from the point marked "E," on the Waterloo placer, down to the point marked "F," on the Windward placer.

Q. Where is the Windward placer? In what direction is it? A. West.

Q. And what does the map show between those points?

A. The map shows the position of the lower phosphate bed as it extends from the natural outcrop at the point "E," through the upper tunnel and lower tunnel of the Waterloo, around and down to the bottom of a drill hole 150 feet in depth, which is located at the point "F."

Q. What was this drill hole, if you know?

A. I understand the discovery on the Inman placer, of phosphate.

Q. And is how far below the surface?

A. 150 feet.

Q. And what is the extent—that is, what distance is it from the outcrop to this point 150 feet in depth on the Windward?

A. I think it is 1065 feet. The scale of the map is one inch to 30 feet. I think that is the distance.

Q. Where is the Windward placer with reference to the Montpelier Creek channel?

A. It lies to the southeast.

Q. Of the creek channel? A. Yes, sir.

Q. Well, does it adjoin the creek channel? [587]

A. Well, it comes down pretty close to the creek at its lowest point.

Q. It is the lowest claim near the creek?

(Testimony of Fred B. Weeks.)

A. Yes, sir.

Mr. BUDGE.—We offer that in evidence, also, Judge—Defendant's Exhibit 3.

Q. Mr. Weeks, are you familiar as to the manner in which phosphate rock is used? A. Yes, sir.

Judge DEY.—We interpose an objection to the question covering all testimony of like nature, upon the ground that it is immaterial in establishing the question of the location of the ground under the lode or placer law.

Q. And to what extent have you had to do with the use of phosphate rock?

A. Well, I first began to use it when I was a boy on the farm, and sowing it on the ground, and so on, and have continued its use more or less down to the present time.

Q. In what parts of the United States have you used it personally?

A. Well, in my boyhood days I used it in the State of New York, and in 1898 I bought a farm fifteen miles west of Washington, Virginia, and owned that farm until March, 1909, and I used fertilizer to a very considerable extent every year on that farm.

Q. Phosphate rock? A. Yes, sir.

Q. What is the chemical contents of this rock? [588]

A. Calcium — calcium phosphate—calcium carbonate.

Q. And the chemicals of which it is constituted are calcium and phosphoric acid? A. Yes, sir.

Q. And is this deposit of calcium phosphate, phosphorite? A. No, sir.

(Testimony of Fred B. Weeks.)

Q. What is the difference between this and phosphorite?

A. Phosphorite is a variety of the mineral apatite. Its structure, as defined by mineralogists, is fibrous, or vitreous. It always contains some proportion of fluorine. It differs from the material in this rock in that there is no fluorine in this rock, and there is no material showing of a fibrous or radial structure; that this rock is an amorphous, uncrystallized material, formed entirely of these oolites and cementing material that I have previously described.

Q. Is phosphorite a crystalline deposit?

A. Yes, sir.

Q. Is phosphorite found in this country?

A. It has never been found up to the present time—it has never been reported.

Q. Where is it known to exist?

A. In Spain and France and Germany.

Q. What is this calcium phosphate mined for?

A. For its use as a fertilizer, to enrich the ground.

Q. And is that the only use to which it is put commercially at this time? A. Yes, sir.

Q. And for what constituents that it contains is it valuable? [589]

A. Calcium phosphate.

Q. Have you familiarized yourself with the manner in which this rock is treated for use?

A. Yes, sir.

Q. And in what manner have you investigated that subject?

A. I have gone right carefully through the factory where the rock from this Montpelier region is

(Testimony of Fred B. Weeks.)

treated, and have seen it in operation—the actual making of fertilizer from the rock.

Q. Explain the method of preparation.

A. As the rock comes into the mill it passes through an ordinary rock-crusher, which breaks up and crushes the rock into a fine condition. From this crusher it is raised by an elevator to a distance of 14 or 15 feet, I should say, above the crusher. It passes over a series of sieves, as they call them, and the material that is ground fine enough passes on, or passes through this sieve, and that that is too coarse is carried below into a roller process, where the material that was too coarse to pass through these sieves is ground into a fine condition, and this is raised by an elevator and passed over into a storage bin, and in that condition it is about like flour. Then there is a receptacle made for the rock, and by the side of it one for the sulphuric acid, and the man in charge there who is doing the work puts in a certain amount of phosphate rock and a certain amount of sulphuric acid, where they are mixed together, and they pass through into a bin, a large receptacle below, where they are allowed to remain for several hours, frequently overnight, and the material is then run through another [590] machine, which breaks it up. It has a tendency to stick together, some of the material does, in this receptacle, and so it is run through this machine to break it up in a separator, so that it is very fine; and from there it is carried out into a large storage shed, where it is stored in piles, and where it usually remains for several weeks before it is shipped.

(Testimony of Fred B. Weeks.)

Q. And in that state it is used for fertilizing purposes? A. Yes, sir.

Q. What proportion of calcium phosphate does this rock contain that is found in these beds on these properties—on these claims in question?

A. It averages about 70%.

Q. And is it mined or used for phosphorus, or for any phosphorus content in it?

A. No, sir; there never has been any phosphorus made from this rock that I know of.

Q. Is the calcium—the constituent of calcium that is found in this rock—of beneficial use as a fertilizer on the land? A. Yes, sir.

Q. And what effect does it have?

A. The effect of the calcium in the calcium phosphate is similar to that of ordinary lime, which we put lime upon the soil to sweeten it.

Q. What would be the effect of using the phosphoric acid that is within this deposit, if the calcium were extracted and the phosphoric acid alone was used?

A. Well, I don't think you could use it in that way. You [591] would have to have some material to carry your phosphoric acid, in order to put it upon the soil.

Q. If it could be carried, what would be the effect of it? Would it be beneficial or otherwise?

A. Well, I don't know. I think it would be entirely speculation to say what would be the result.

Q. How does the phosphoric acid act upon the land, as compared with the calcium that is in this

(Testimony of Fred B. Weeks.)

calcium phosphate, and how do the two act together as a fertilizer?

A. Well, the calcium—the combined calcium phosphate which is in the fertilizer, acts in two ways, one of which furnishes phosphoric acid for the use of the growing plant, and the calcium, which is the chemical combination, acts in sweetening the land, or in changing its mechanical condition so as to improve the quality of the soil.

Q. Is it essential that calcium be used in connection with this phosphoric acid in this deposit for fertilizing purposes? A. Yes, sir.

Q. Now, in the preparation of this rock, is there any sorting of it, or any part of it that is not used as fertilizer?

A. None at all; it is all used.

Q. And is there any part of it that is not beneficial to the land, when treated as you have described?

A. Well, it is such a small part that it is almost infinitesimal. There is a small amount of silica shown in various chemical analyses that would probably neither be beneficial nor otherwise to it; but it is exceedingly small. [592]

Q. But I am speaking of the calcium phosphate itself; is there any part of it that is not beneficial?

A. No, sir.

Q. And is this phosphate rock mined and used as a whole, then? A. Yes, sir.

Q. What have you to say with reference to the comparative value of the use of this phosphate rock as treated, or its use in the natural state?

(Testimony of Fred B. Weeks.)

Judge DEY.—It is understood that all this goes in subject to our objection?

Mr. BUDGE.—Oh, yes.

A. Well, I know from reading, and from observation and experiments of other parties, and from my own use of the raw rock and of the treated rock, that under proper conditions it is far better to use the raw rock than it is the treated rock.

Q. What are the conditions under which raw rock may be used with more beneficial results than the treated rock?

A. The raw phosphate rock should always be used upon soil that contains a large amount of humus, or one should add to the soil either manure or the plowing under of green crops, to start the fermentation that makes the humic acids which attack the fertilizer, the raw rock, and make the calcium phosphate valuable to the plant. If we take the raw rock and spread it upon a sterile soil from which the humus has been removed by one process or another, it is almost of no value at all. To improve the conditions which I have described, the raw rock is far better for use than the treated rock. [593]

Q. You spoke of the plant taking up the calcium phosphate. I will ask you whether or not the phosphoric acid is the only constituent which is used by the plant?

A. No, I don't think so. There is some lime that is used by practically all plants; and undoubtedly some of the lime or gypsum which is in the treated fertilizer would be used by the plant.

(Testimony of Fred B. Weeks.)

Q. For what purpose is gypsum used, Mr. Weeks; I mean for fertilizing purposes?

A. In the same way that we use lime for treating soil which is becoming very sour and will not yield paying crops.

Q. And what effect does the calcium in the calcium phosphate have? Does it have a different effect, or the same effect, or a similar effect to the gypsum or lime?

Q. My own experiments (if you may call them such) show that the calcium phosphate will sweeten the soil to a very considerable extent, and doubtless in the same way, the same chemical combinations taking place and the chemical conditions being made that occur with lime.

Q. What proportion of this calcium phosphate is calcium—what percentage, approximately?

A. I have forgotten exactly. Calcium carbonate runs up to something like 30%.

Q. 30%? A. Yes—calcium carbonate.

Q. In what states, Mr. Weeks, from your study of this question, have experiments been made as to the profitable use of this phosphate rock in its raw state, and covering what periods of time? [594]

A. Experiments have been made with the raw phosphate rock in Maine, Massachusetts, Rhode Island, Pennsylvania, Maryland, Ohio and Illinois. They are experiments of what are known as United States Experiment Stations, conducted under the Agricultural Department, and those experiments cover a period of from five years, as a minimum, in

(Testimony of Fred B. Weeks.)

Illinois, to 21 years as a maximum, in Massachusetts.

Q. And compared with the use of the rock in its treated state, what do those experiments show?

A. In the various publications which I have read describing those experiments, the summary or conclusion is that under proper conditions the raw phosphate rock is worth probably double what the treated rock is. The experiments in Maryland were conducted at the station at College Park, Maryland. I have been there for a good many times, in different seasons and different years, watching the results of those experiments, and it was as a result of those personal observations there in the field that I began the use of the raw rock upon my own farm.

Q. And in the conduct of these experiments I will ask you whether or not there is any sorting process, or whether the rock is used as a whole?

A. Well, so far as I know, there is no sorting process. The material as it comes out of the sack as you buy raw rock, looks just like raw ground phosphate rock.

(Witness temporarily excused.) [595]

[Testimony of Thomas L. Glenn, for Defendant.]

THOMAS L. GLENN, a witness called in behalf of the defendant, being first duly sworn, testified as follows, to wit:

Direct Examination.

(By Mr. BUDGE.)

Q. What is your name? A. Thomas L. Glenn.

Q. How old are you, Mr. Glenn? A. 64, past.

(Testimony of Thomas L. Glenn.)

Q. Where do you reside?

A. Montpelier, Idaho.

Q. What is your occupation?

A. Practicing attorney—attorney at law.

Q. Were you ever interested in any mining properties on what is known as Smith's Fork, in Wyoming? A. Yes, sir.

Q. What kind of properties were they?

A. Coal.

Q. And in what years were you interested in them?

A. 1897, 1898, and to a small extent for several years afterwards.

Q. In 1897? A. 1897.

Q. And to what extent were those coal properties worked—by you?

A. Well, we put in on a tunnel that had been started by another party there, we put in about 99 feet of tunnel work, beginning at a point about 80 feet under the earth. [596]

Q. And did you run more than one tunnel?

A. Yes, sir. Then we put in two other tunnels, one 58 and one 54 feet, and a shaft of 68 feet.

Q. And did you ever have any other experience in respect to coal mines or coal properties?

A. Well, with the exception—that is, I attempted to develop the lands now in controversy.

Q. What did you have to do with this deposit on Montpelier Creek, which is now known as the phosphate deposit?

A. In 1901 Mr. Brennan and I put in a tunnel on —I presume it is the north side, or the northwest

(Testimony of Thomas L. Glenn.)

side of Montpelier Creek, and on a line with the Waterloo claim; we put in a tunnel there about 250 feet deep.

Q. Well, from your investigations of this property before you commenced the working of it, what did you conclude as to the nature of this deposit?

Judge DEY.—Objected to, as the witness has not shown himself qualified to answer that question.

A. Well, we thought from the external appearance that it was coal, too; and with that view, or with that idea, we ran this tunnel.

Q. And did you make any filings upon this ground? A. Yes, sir.

Q. And what kind of filings?

A. We filed declaratory statements for coal.

Q. You afterwards sold out your interest?

A. I afterwards sold out to the agent of the San Francisco Chemical Company. [597]

Cross-examination.

(By Judge DEY.)

Q. What year was that, Mr. Glenn? A. Sir?

Q. What year was this?

A. That I sold out our claim there?

Q. Yes.

A. I think it was 1903, as well as I now remember.

Q. You thought from the appearance that you had a vein of coal there?

A. Yes, sir, there was every indication. I forgot to state that we also found what we considered a coal on Bear River, about—I should judge about four miles from Soda Springs. There was a cropping on

(Testimony of Thomas L. Glenn.)

the edge of the river, two horizontal veins, one about 18 inches thick, and one about eight feet thick, which we believed to be coal, and I still think so. That is, I think it is a coal cropping.

Mr. BUDGE.—That is some distance from this outcrop? A. Yes—about 30 miles.

Mr. BUDGE.—Well, I was just inquiring as to this property.

Q. Well, has that coal experience been your sole doings with this ground in controversy?

A. Yes, sir, with the exception of my observation as it has been developed.

Q. Let me refresh your recollection by asking you whether or not at some time you made lode locations called the Emerald, [598] the Ruby, the Topaz and the Opal lodes? A. No, sir.

Q. In Montpelier Canyon?

A. No, sir; we never entered any but declaratory statements for coal.

Q. Well, you named them, did you? A. Sir?

Q. You named them?

A. Why, I don't remember now. I don't think we did.

Q. No?

A. I think we located by the legal subdivisions.

Q. But I am asking you if you didn't make some lode locations down there?

A. No, sir; I never made one in my life—that is, if my name was ever used in one I don't know it.

Q. You would know that?

A. I think so, yes.

(Testimony of Fred B. Weeks.)

Judge DEY.—That's all.

An adjournment was thereupon taken until to-morrow morning at 9:30 o'clock A. M. [599]

On Thursday, the 22d day of June, 1911, at 9:30 o'clock A. M., the hearing was resumed, pursuant to adjournment.

[Testimony of Fred. B. Weeks, for Defendant (Recalled).]

FRED. B. WEEKS, a witness heretofore called in behalf of the defendant, and duly sworn, being recalled in behalf of the defendant, testified as follows, to wit:

Direct Examination.

(By Mr. BUDGE.)

Q. Of what metals or minerals, or both, is this deposit composed, Mr. Weeks?

A. Calcium—calcium phosphate—and a very small amount of iron and aluminum.

Q. Is the metal calcium in combination with the nonmetalliferous phosphoric acid? A. Yes, sir.

Q. Now, in what respect does that differ from the constituents of gypsum?

A. Gypsum is a chemical combination of calcium sulphate, the calcium being the metallic portion and sulphur the nonmetallic.

Q. And what have you to say as to limestone?

A. That is a calcium carbonate.

Q. The metal calcium in combination with— [600] A. —carbonic acid.

Q. And borax?

A. One form is a silicate of borax; the most com-

(Testimony of Fred B. Weeks.)

mon form is the mineral Colmanite, which is calcium borate.

Q. Which is the metal calcium with what?

A. Boric acid.

Q. And it is nonmetalliferous?

A. It is nonmetalliferous.

Q. And the salt?

A. The salt is sodium chlorine.

Q. That is the metal calcium with what?

A. With chlorine—nonmetalliferous.

Q. Have you used lime, or what is known chemically as calcium oxide, for fertilizing purposes?

A. Yes. To a certain extent the lime enters into the constitution of plants, in a very small amount. The principal object of using lime upon the soil is, as I stated before, to sweeten the soil—to change it from that sour condition. It also, besides this chemical effect, it has a mechanical effect upon the soil.

Q. And is this same result produced to a degree in the use of the calcium phosphate?

A. Well, not to the same extent that the calcium carbonate does, or the calcium oxide; but in my opinion, from the results I have seen of my own use, the calcium phosphate does to a considerable extent have the same effect as the calcium oxide.

Q. And is that by reason of the existence in the fertilizer of the calcium in combination with the phosphoric acid? [601] A. Yes, sir.

Q. Are you familiar with limestone deposits, Mr. Weeks? A. Yes, sir.

Q. And with limestone deposits that are worked

(Testimony of Fred B. Weeks.)

for commerical purposes? A. Yes, sir.

Q. Where? A. In New York and Maryland.

Q. Any Western States?

A. In Utah and Nevada and Wyoming.

Q. What is the manner of the occurrence of these limestone deposits?

A. They occur as bedded, sedimentary deposits, being a part of the sedimentary series of the country in which they occur.

Q. Have they a dip—those deposits?

A. They have.

Q. And a strike? A. Yes, sir.

Q. Have they overlying beds and underlying beds?

A. Yes, sir.

Q. And are they similar in that respect, or dissimilar, to the deposits of calcium phosphate on the claims in question, as to the manner of occurrence and their position in the earth?

A. They very closely resemble these deposits—the phosphate of lime—in all of those respects.

Q. What have you to say as to the cement deposits, or the constituent that is used for the manufacture of cement? Are you familiar with those deposits?

[602]

A. Yes, sir, in several places.

Q. In what sections of the country?—where?

A. In New York and in Utah. I don't recall any others at this moment.

Q. And how do they occur, as compared with the phosphate deposits?

A. They occur in stratified, sedimentary rocks,

(Testimony of Fred B. Weeks.)

with dip and strike similar to the phosphate deposits.

Q. And as to gypsum; are you familiar with those deposits? A. Yes, sir.

Q. In what portions of the country?

A. Principally in New York and in Utah.

Q. And how do they occur?

A. They occur as a part of the stratified series, with dip and strike, like the phosphate beds.

Q. Have a floor and a roof? A. Yes, sir.

Q. And, as you say,—did you say sedimentary?

A. Yes, sir.

Q. How does salt occur?

A. Salt occurs both as the deposit from a solution in water, and also in stratified sedimentary beds.

Q. And as to those stratified sedimentary beds; have they a floor and roof, a dip and a strike?

A. Yes, sir.

Q. Calling your attention to coal deposits, are you familiar with coal deposits? [603] A. Yes, sir.

Q. In what sections of the country?

A. Wyoming, Utah, and a small deposit of coal in Southwestern Nevada.

Q. And how does coal occur, as compared with this deposit?

A. It occurs as a part of a stratified sedimentary series, having a dip and a strike similar to the phosphate beds.

Q. How does it compare with the extent of the deposit on the dip? A. They are very similar.

Q. Extensive? A. Very extensive.

Q. I think you stated on yesterday that it had been

(Testimony of Fred B. Weeks.)

determined that this phosphate rock extended on a dip in one place here for a distance of about eight miles. From your study of the topography of the country where these deposits occur that are in question in this suit, what would you say as to the probable extent of the deposit; that is, the deposit which has its dip westerly on the east side of Montpelier?

A. I consider that from the exposures of the phosphate series in Montpelier Canyon, they extend to the west to underneath Bear River Valley, and appear again (the same series) upon the surface in what is known as the Bear River Mountains, near Paris—west of Paris.

Q. When you say "Bear River Valley," you mean the Bear Lake Valley?

A. The Bear Lake Valley, yes, sir. And in fact these deposits extend both on the dip and strike, much farther than [604] what I have just stated. It is really a bed—a layer—that extends for several hundred miles in each direction; that here and there it has been brought to the surface by the internal forces which have folded rocks, and that those are the points where we now see it. Nevertheless, it extends as a bed completely underneath the territory where it does not actually come to the surface.

Q. Now, what is the approximate area—that is, the length and breadth of the area—which is underlaid by this stratum of phosphate rock, and describe from what points it extends. That is, describe the northerly and southerly ends of the area, and the sides, approximately.

(Testimony of Fred B. Weeks.)

A. I have found the phosphate bed occupying the same geological position that is occupied by the Montpelier beds, in the mountain ranges near Cobre and Montello, Nevada. That is the farthest point to the west of which I know it. To the east I know it in the vicinity of Salt Lake. It then extends north, through the area shown on Defendant's Exhibit 1, and still farther north of this area to a point in Western Montana, some 40 or 50 miles south and west of Butte, Montana. That represents its extension north and south; and to the east, beyond the limits of Defendant's Exhibit 1, I have found it in the several places that I described yesterday, through Wyoming, as far east as the Rocky Mountains north of Cheyenne. In all these areas where the phosphate beds come to the surface we find that it is associated with —that is, it has above and below it strata containing the same fossils that we find upon the Montpelier deposits, forming the top and bottom of the phosphate series at Montpelier. **[605]**

Q. The same stratification? A. Yes, sir.

Q. Now, what is the distance—the length of this area, rather,—and the width of it—approximately?

A. The width of it east and west is approximately 500 miles, and north and south 300 miles.

Q. What is the conclusion, or the accepted idea of geologists who have treated of the manner of formation of this deposit, as to how it came to be formed, or the manner in which it was formed?

Judge DEY.—Objected to as incompetent, as asked.

(Testimony of Fred B. Weeks.)

Q. I mean throughout the entire area.

A. It was deposited upon the bed of an ocean, in comparatively shallow water, grain upon grain, until the whole phosphate series has been laid down upon the limestone strata which forms the base of the phosphate series.

Q. And then overlaid by the—

A. —then overlaid by younger rocks—younger strata—formed in the same way.

Q. Now, how are placers formed, Mr. Weeks?

A. Placers may be formed by the breaking up of the rock strata into small particles, and moved by water to lower positions, and concentrating there in gulches, where they are found, forming such gulch placers.

Q. Are such deposits as you have described sedimentary? I mean sedimentary in the sense that they are deposited in the position in which they are found by the action of water. [606]

A. In that sense they are.

Q. And in what other manner are placers formed?

A. Placers may be formed along the sea beach. For instance, we have in Oregon at the present day a formation of placers as sea beach deposits, and those are not worked for their gold contents. And the same is true with various placer deposits in Alaska, and they are known in other places throughout the world. It is not only known that they are formed now, and are forming now, but that they have been formed in previous geological ages. We find in the strata, beds which were formed, which were

(Testimony of Fred B. Weeks.)

originally placers and formed in the same way that placers are formed to-day, now lying covered by hundreds of feet of stratified rocks.

Q. And underlaid by such rock?

A. Underlaid by other stratified rocks.

Q. And are these overlying and underlying rocks, solid? A. Yes, sir.

Q. Where are such placers found, Mr. Weeks?

A. We have such placers in California, except that the covering of the placer is an eruptive rock and not a sedimentary rock; the placers themselves are covered by a mass of eruptive rock, forming the roof you may say of the placer. Such deposits are known in other countries; for instance, in Australia.

Q. Now, Mr. Weeks, describe how veins are formed.

A. One of the most common forms of veins are those which occupy fissures, or cracks, or crevices, that have been previously made by the contraction of the earth's surface, or by the irruption of igneous materials into the rock masses or [607] strata, and thus making these fissures. Another form of vein deposit is that in which the mineral-bearing solutions dissolve out a portion of the rock masses, which solutions are penetrating, and leave in their place minerals or other matter which are precipitated.

Q. How does the mineral deposit or ore deposit come into place in the crevice in which it is found in a vein?

A. These fissures and cracks form the passages by which the water or mineral bearing solutions pass

(Testimony of Fred B. Weeks.)

through the rocks, and in passing through them a portion of the minerals which are in solution are deposited along the sides of these cracks and crevices, often extending out into the rocks which are close to these cracks and crevices, and in them a portion of their burden of mineral matter is deposited.

Q. Is this forcing of the mineral solutions in these cracks and crevices due to the action of heat?

A. There is no doubt but what heat is one of the attendant phenomena; but the immense pressure under which everything within the crust of the earth at considerable depth exists, is probably the main cause for the forcing of these mineral solutions through the rock strata in the crust of the earth.

Q. What do you understand by "gangue"?

A. A vein or a lode deposit is formed of a substance which contains metallic ores and other materials, and whatever material is in a vein that is not a metallic ore constituent we call the gangue of a vein.

Q. Does it come in with the ore in solution into the crack and crevice, as a part of the solution? [608]

A. In most cases it does.

Q. What have you to say, Mr. Weeks, as to whether or not veins or lodes—in veins or lodes—as to whether or not the ore deposit conforms to the stratification in which it occurs, or in which it is found?

A. I don't know of an instance, nor I have never read of an instance, in which the ore of a vein or lode conforms to the stratification of the beds which are upon either side of the vein or lode, or form a

(Testimony of Fred B. Weeks.)
part of the vein or lode.

Q. Well, how do veins or lodes occur with reference to the stratification?

A. They usually occur cutting across the stratified beds at various angles. They may also occur as a replacement of a sedimentary bed itself, but they don't follow the stratification of that bed; simply the vein or lode in that case is formed by the ore-bearing solutions removing particles of the sedimentary bed, leaving in its place the metallic ores which we now find in such a vein or lode. But in the formation of a vein or lode of that character the vein matter and the metallic substances do not follow the stratification of the bed itself.

Q. What have you to say as to the regularity or irregularity of the vein deposit, or the deposit in what is known as a vein? By that I mean its regularity as to width and extent; and also describe the condition with reference to veins as to the quality of the deposit.

A. In reference to the extent of a vein, in width it will vary from practically nothing up to many feet, in width, and it varies from point to point along the vein or lode with reference [609] to such thickness. So that a vein which would average three feet in width might in some places measure only six inches in width, or even less. So that when we speak of the thickness or width of a vein or lode we always carry in mind the idea that it is a varying quantity. The same statement is true with reference to the quality of a vein or lode; the amount of metallic min-

(Testimony of Fred B. Weeks.)

erals which are deposited in the vein or lode varies from point to point. There may be large parts of a vein or lode which contain so small an amount of the metallic minerals that it cannot be worked or treated commercially. There are other places, in what we call ore chutes, in which ores are concentrated, and the value of the material is very high. These ore chutes may extend for many feet along a vein, or they may be of a very small amount. So that as to the quality or quantity of the valuable material in a vein it varies very greatly.

Q. Is the deposit which is found in a vein older or younger than the surrounding rock, commonly called the country rock? A. It is always younger.

Q. Are veins, as the term is commonly understood in mining and geology— Well, I will ask you to describe the position of veins or lodes, whether they are horizontal or vertical; or how do they occur?

A. A vein may occupy any position from the horizontal to the vertical.

Q. What have you to say, Mr. Weeks, as to the age of veins? Is there any age under which veins are classed?

A. Oh, no; you will find veins or lodes in rocks of all ages. **[610]**

Q. They belong to no particular age, then?

A. No, sir. The fact is that veins often penetrate through stratified rocks of different ages; that is, beginning in rocks of one age and cutting through into rocks of another age.

Q. In what class of rocks are veins usually found?

(Testimony of Fred B. Weeks.)

Judge DEY.—We object to that as wholly irrelevant and immaterial to any issue in this case.

A. I think the larger number of veins are usually associated with igneous rocks; although, of course, many are often found in sedimentary rocks.

Q. Calling your attention, Mr. Weeks, to this phosphate deposit, and bearing in mind the description which you have given as to veins which are formed by dissolution of some sedimentary deposit and the replacement of it by the vein deposit; I will ask you whether in this deposit there has been a process of replacement; and if not, state the reasons why you come to that conclusion.

A. I have never seen any evidence of the replacement of a bed existing prior to this phosphate bed and the phosphate material replacing any of it. There is no evidence—no indication at any of the many points that I have examined this phosphate bed, of a replacement process. It is always the case that where rock strata are replaced by other materials, that some portions of those rock strata are left behind, in which the replacement process has not taken place. So that in a bed of limestone where a large—or where parts of the calcium carbonate [611] had been removed, there are always yet large portions of limestone remaining; so that in—

Q. Just a moment. Is that true, Mr. Weeks, as to all veins which are formed by a process of replacement? A. Yes, sir.

Q. Do you know of any exception?

A. No, sir. In this bed of phosphate we find no

(Testimony of Fred B. Weeks.)

particles of limestone or particles of other substances that might have been, some parts of them, replaced. The bed itself is everywhere composed of these grains, or oolites, and the material which cements them together, and we never find anything else in it.

Q. With reference to this deposit of phosphate rock, is there any fissure, as the term is understood in mining and geology?

A. No, sir, I have never seen one.

Q. And how does this bed occur with reference to the uniformity of its quality and thickness, as compared with veins or lodes?

A. The lower phosphate bed upon the Montpelier deposits, and on the extension of the same bed north and south, is very regular, both as to its thickness and as to its quality; and the same may be said for phosphate beds in other localities; that wherever they are exposed they show a remarkable uniformity in the regularity of their thickness and the evenness of the quality of the material.

Q. And as to their conformity to the stratification, in what respect do they differ from veins or lodes? [612]

A. They differ from veins or lodes in that veins or lodes do not conform to the stratification of the country rock, and in this case of the phosphate series they conform absolutely with the lay of the country, and with the strike and dip of the underlying and overlying rocks; and they are also remarkable from the fact that in their deposition the line of demarcation between the upper and lower limits is strongly

(Testimony of Fred B. Weeks.)

marked, and the limestone which caps the lower phosphate bed within the Montpelier deposits is fractured by joint planes, and there is along these joint planes no deposition of any phosphatic or other material, which is the case in vein or lode deposits; that where the enclosing rock of a vein or lode contains joint planes similar to these, ore-bearing solutions go out into these joint planes and deposit more or less of the material. In this case of the Montpelier deposits, and other parts of the phosphate area, we have never seen any indication of the deposition of phosphatic material along these joint planes.

Q. What have you to say as to the age of this phosphate rock—the age in which it was formed?

A. It was laid down in the carboniferous—the upper carboniferous age.

Q. What do you mean by that age?

A. That is one of the divisions into which geologists have divided the sedimentary strata which form the earth's surface, beginning with the Cambrian, then the Ordovician, the Silurian, the Devonian, and then the Carboniferous.

(At the request of Mr. Budge, photograph was marked Defendant's Exhibit 4.) **[613]**

Q. Calling your attention to Defendant's Exhibit 4, Mr. Weeks, did you take that photograph?

A. Yes, sir.

Q. And what does it represent?

A. It represents the tunnel and the exposure of the phosphate—the lower phosphate bed along the side of the tunnel, and the overlying limestones, phosphates and shales, at the point on the Waterloo

(Testimony of Fred B. Weeks.)

placer marked Tunnel O.

Mr. BUDGE.—We offer this also, Judge.

(Submitting the same to Judge Dey.) Defendant's Exhibit 4 is offered.

Q. Calling your attention to the stratification as you have it indicated upon Defendant's Exhibit 4, you have first the Basal limestone; then the main phosphate bed; and then a bed of limestone. Now, with reference to this bed of limestone last mentioned, and which appears upon this photograph as the lightest in color of any of this strata, is that the deposit to which you referred when you stated that it had some seams or cracks wherein none of the phosphate rock could be found, or the phosphatic material?

A. Yes, sir, that is the bed, and those joint planes may be seen in that photograph extending entirely through that two-foot bed of limestone.

Q. Is this calcium phosphate deposit an ore deposit, Mr. Weeks? A. No, sir.

Q. What is ore?

A. It is the metallic contents of a vein or lode, which [614] is in sufficient amount and in such combination that it can be economically extracted.

Q. With what other materials—mineral deposits—is phosphate classified by geologists?

A. As a nonmetallic substance, as classified with gypsum, borax and salt, and other materials of that general character.

Q. Is Heinrich Ries a recognized authority on geology?

(Testimony of Fred B. Weeks.)

A. Yes, sir; he is the Professor of Geology at Cornell University.

Q. And is his work on Economic Geology an authority? A. Yes, sir.

Q. And in this work how is it classified?

A. As I have stated—not as an ore deposit.

Q. But with what?

A. With gypsum and borax and salt, and materials of that kind.

Q. Recurring, now, Mr. Weeks, to the Defendant's Exhibit 2, and as to the manner in which the lode locations have been made upon this phosphate deposit; how do these lode locations conform, or do they conform, to the strike of the deposit?

A. The only lode location which conforms to the strike of the deposit, or of the phosphate series, is the Hickman lode, and that only in part.

Judge DEY.—What lode is that?

WITNESS.—The Hickman.

A. The part of the Hickman lode which extends to the southwest is not upon the strike of the bed.

Q. What is the strike of this bed?

A. The strike of the bed is essentially north and south. **[615]** It varies very slightly from that, as the dip of the bed varies slightly from directly west.

Q. How have these lode locations been made, then, with reference to the strike?

A. They have been made at varying angles with the strike, the lode locations following pretty closely the outcrop of the lower phosphate bed, but do not conform to the strike of the bed.

Q. Calling your attention particularly to the Over-

(Testimony of Fred B. Weeks.)

ton and Mount Pleasant lodes, and also to the Cumberland: how are they laid out with reference to the strike?

A. They are laid at an angle with the strike, the strike being north and south and these lodes have a northeast-southwest direction. They are at an angle both with the strike and dip.

Q. And as to the other claims—lode claims—how are they laid out with reference to the dip?

A. The Hickman and the Arkansas lodes in part are laid along the strike of the bed. The Tennessee lode follows the dip of the bed. The Mount Pleasant, the Overton and the Cumberland are laid out at an angle with the dip of the bed, the dip being to the west in those cases. In the Jimtown and Fentress, Obed and Obey lodes, they are at an angle with the dip of the bed; so that the direction of these lodes does not conform either with the strike or with the dip.

Q. What is the dip of this deposit?

A. It varies from 12° to 35°.

Q. I mean in what direction? A. To the west.

Q. Always? [616] A. Yes, sir.

Q. Calling your attention now to the Plaintiff's Exhibits "A" and "B," which represent the Frances placer mining claim and the Freyerson lode mining claim, and the Raymond placer and the Japan and China mining lode claims; have you examined those claims? A. I have.

Q. And on how many occasions, Mr. Weeks?

A. My first examination was in 1906. I was there again in 1907 and in 1909 and in 1911.

(Testimony of Fred B. Weeks.)

Q. Is that the same deposit or a similar deposit to the deposit back of Montpelier?

A. It occupies the same geological horizon.

Q. And is it the same material?

A. Exactly similar material.

Q. Calcium phosphate? A. Calcium phosphate.

Q. What is the position of the bed of phosphate upon those claims?

A. It is dipping steeply to the east.

Q. In all of them?

A. At the tunnel near the discovery point on the north end of the China lode claim, the beds there are shown dipping to the west. At all other points where the beds are exposed, either naturally or in tunnels, the beds are dipping at a steep angle to the east.

Q. Do you find upon the same lode claim, or within the boundaries of the same lode claim, different dips, or dips in different directions? [617]

A. It is slightly different. The dip in all cases is very steep.

Q. And upon what claim is the dip in both directions?

A. Well, I will amend that by stating that there is no evidence that upon one—in one lode claim there is a change in dip from one direction to the other; but on the south end of the Japan lode in those tunnels the beds are dipping steeply to the east, while at the north end of the China lode they are dipping to the west.

Q. Mr. Weeks, are you familiar with the deposits which have been located upon by the Utah Fertilizer

(Testimony of Fred B. Weeks.)

Company? A. Yes, sir.

Q. Where are they situated?

A. In Georgetown Canyon, east of Georgetown, Idaho.

Q. And what is the nature of that deposit?

A. That is a deposit of calcium phosphate, similar to that at Montpelier, having the same associated strata above and below the phosphate series in Georgetown Canyon that there is in the Montpelier Canyon.

Q. What form of locations have been made upon these deposits near Georgetown, Mr. Weeks?

Judge DEY.—Objected to as wholly immaterial and incompetent, in any sense.

A. Placer locations, and later lode locations have been placed on some of them.

Q. The placer locations, are they the locations of the Utah Fertilizer & Chemical Manufacturing Company? A. Yes, sir. [618]

Q. Are you familiar with what is known as the Hillside group of placer mining claims?

A. Yes, sir.

Q. In sections 24, 25 and 26, township 10 south, range 44 east? A. I think that's right.

Judge DEY.—What State is that in?

Mr. BUDGE.—Idaho.

Q. And that is how far north of these deposits in Montpelier—near Montpelier?

A. About 10 or 12 miles in a direct line.

Q. Calling your attention to this map which appears as a part of Bulletin 430H, U. S. Geological Survey, Plate 5, page 28, I will ask you what that

(Testimony of Fred B. Weeks.)
map represents, Mr. Weeks?

A. The map represents the areal distribution upon the surface of the phosphate series and of the beds which underlie and overlie them, and there are also three cross-sections which show the stratigraphy and structure of the areal maps.

Q. And from your personal examination of this area, are you able to state whether or not this is a correct representation of the conditions there?

A. Yes, sir; I have made a careful study of it; I know that that is correct.

Mr. BUDGE.—(To Judge DEY.) Judge, I desire to introduce that map for the purposes of illustration, and it will not be necessary to introduce the whole bulletin, but I would like to take it out and introduce the map itself.

Judge DEY.—Well, just offer it, and leave **[619]** any objection pending until my cross-examination.

Mr. BUDGE.—Yes.

Judge DEY.—All right.

Mr. BUDGE.—I will have it marked Defendant's Exhibit 5.

(Said plate or map was so marked.)

Q. Are there any places upon these claims which are in question where the stratification is similar to the stratification as it appears upon this map, Defendant's Exhibit 5?

A. The stratification is the same, but the structure or the folding of it is not the same.

Q. In what respect does it differ?

A. The beds at Montpelier have a dip to the west in every place where they are exposed, while in

(Testimony of Fred B. Weeks.)

Georgetown Canyon the beds in some places dip to the west and in some places to the east; so that there is a fold of the strata which is termed as incline. On one side of this fold the beds dip to the west, and on the other side the beds dip to the east. That is the explanation of the sections which are shown on the side of the map—of the Exhibit 5.

Q. Are you familiar, Mr. Weeks, with what is known as the Highland placer mining claim?

A. Yes, sir.

Q. On the Utah Fertilizing and Chemical Manufacturing Company, near Georgetown?

A. Yes, sir.

Mr. BUDGE.—We will have these marked, also.

(Said documents were thereupon marked Defendant's Exhibits 6 and 7, respectively.) [620]

Mr. BUDGE.—We offer these in evidence, Judge.

Judge DEY.—What are they?

Mr. BUDGE.—They are final certificates of entry for placer mining claims, issued to the Utah Fertilizer & Chemical Manufacturing Company, for placer claims upon these deposits.

Judge DEY.—To those papers marked for identification Defendant's Exhibits 6 and 7 we object as immaterial and incompetent, having no bearing upon any issue in this case, or bearing in any manner upon whether the ground in question is locateable as a lode or as a placer.

Q. Are you familiar with the placer claim of the San Francisco Chemical Company known as the Layland? A. Yes, sir.

(Testimony of Fred B. Weeks.)

Q. Where is it with reference to the Raymond placer?

A. It lays to the north some two or three miles.

Q. And where is it with reference to the Frances?

A. It is north of the Frances.

Q. Also? A. Yes, sir.

Q. Is it upon that same deposit? A. Yes, sir.

Q. Have you examined that claim?

A. Yes, sir.

Q. And it is a calcium phosphate deposit?

A. It is. [621]

Mr. BUDGE.—Now, I will say that the offer of Defendant's Exhibit 6 will be for the Idaho case, and Defendant's Exhibit 7 for the Wyoming case.

Judge DEY.—How about 5?

Mr. BUDGE.—5 is the photograph, and I will ask now—

Judge DEY.—No— 5, as I got it, is that plate from page—

Mr. BUDGE.—Well, I'll tell you, we will have a duplicate— I was going to say that there are some of these exhibits which I shall ask leave to supply, and I will have exact copies of all of them put in with the Wyoming cases.

(At the request of Mr. Budge certain certified copies of certificates of entry were marked as Defendant's Exhibits 8 and 9.)

Mr. BUDGE.—Now, in the Idaho case we offer Defendant's Exhibit 8, and in the Wyoming cases Defendant's Exhibit 9.

Judge DEY.—What are those?

(Testimony of Fred B. Weeks.)

Mr. BUDGE.—They are certified copies of the final certificates of entry for the Layland claim.

Judge DEY.—They are all subject to the same objection.

Mr. BUDGE.—I will ask, will you agree that I may supply these other exhibits—copies of [622] Defendant's Exhibits 1 and 2 and—

Judge DEY.—Why, I agree that the Examiner may make these out in duplicate for the respective cases, attaching either the original or a correct copy to it.

Mr. BUDGE.—Yes. I was going to say that we would prepare them and submit them to the Examiner, or to you.

Judge DEY.—Oh, if they are copies, I don't care.

Mr. BUDGE.—Yes, that's all. That will be of Defendant's Exhibits 1, 2, 3, 4 and 5, to be attached to the record in the cases pending in the United States Circuit Court for the District of Wyoming.

Q. Mr. Weeks, do you know of any vein deposit which contains fauna? A. No, sir.

Q. In that respect, in what manner does this deposit differ from a vein deposit? In what respect does this phosphate deposit differ from a vein deposit?

A. In a vein or lode deposit fossils have never been found within the bounds of the vein or lode. The rocks on either side of a vein or lode, if sedimentary, may be fossiliferous. In the phosphate series the beds which are above and below the series are fossiliferous; and the beds of phosphate and

(Testimony of Fred B. Weeks.)

limestone and shale which comprise the phosphate series are each and every one of them fossiliferous. So that the whole [623] or any part of the phosphate series may be said to be fossiliferous, containing many fossilized shells; while we never find such an occurrence in a vein or lode.

Q. Have you had a microscopic plate or plates made of this phosphate material?

A. Yes, sir; I have had a great many thin sections—of what we call thin sections of the phosphate rock, made. That is, the rock—a piece of the rock is ground upon a stone until it is very thin—very thin. That is cemented upon glass, so that with the microscrope you see directly through it, and it shows the internal structure of the minerals or other matter which is in the rock which has been ground to this condition and placed upon the glass. Then this thin section of the rock material is photographed by the use of a microscope, so as to enlarge the minerals or other matter upon the thin section, and those microphotographs (as they are called) are an enlargement of the thin section, and which is itself a part of the rock from which we started to grind the specimen.

Q. Have you any of those photographs with you, Mr. Weeks? A. Yes, sir.

Q. Produce them, please.

(The witness produced two of such microphotographs, and the same were marked for identification as Defendant's Exhibits 10 and 11.)

Q. Calling your attention to Defendant's Exhibits

(Testimony of Fred B. Weeks.)

10 and 11, I will ask you what that photograph represents?

A. No. 10 is a photograph of a thin section of a specimen of the phosphate rock which I collected on one of the tunnels [624] of the Tennessee lode claim, shown on Defendant's Exhibit 2. Defendant's Exhibit 11 is a microphotograph of a thin section of a specimen of the phosphate rock which I collected upon the Cumberland lode, shown on Defendant's Exhibit 2.

Q. What are these dark, oval-shaped spots?

A. Those are the oolites, or grains.

Q. Which you have described heretofore?

A. Which I have described.

Judge DEY.—Did you take these?

WITNESS.—I didn't take those photographs.

Judge DEY.—Objected to, as the proper foundation has not been laid.

Q. Were they taken under your supervision, Mr. Weeks?

A. I collected the material, as I have stated, and the grinding into the thin section was done in part by myself and in part by Mr. Waring, of the Stanford University, and it was done in this way; that I took the specimen and ground it down to a uniform thickness, and then passed the specimen on to Mr. Waring to complete the grinding of it to the thin section. It is difficult to make, and requires a person skillful in it; so that I had to use the services of Mr. Waring to bring them to that condition. But they were made one at a time, and returned to me, and

(Testimony of Fred B. Weeks.)

I marked them with a mark of my own, so that I knew that the thin section was the thin section of the specimen collected at a particular place. These microphotographs were made by Mr. Waring himself, but I placed the thin section which I had marked under the microscope and examined them with the microphotograph in under, to determine that the microphotograph **[625]** that I had in my hand was a reproduction of the thin section which I had under the microscope; and I can state positively that those Exhibits 10 and 11 are microphotographs of the thin sections which were made in this way from material collected at the points stated upon Defendant's Exhibit 2.

Mr. BUDGE.—We offer these—the Defendant's Exhibit 10 in the Idaho case, and Defendant's Exhibit 11 in the Wyoming cases.

Judge DEY.—We renew the objection.

Q. Mr. Weeks, how does this compare—how does this phosphate rock compare, so far as its oolitic structure is concerned, with limestone deposits?

A. There are very many beds of limestone which are formed of oolites in the same way that I have described the formation of these oolites, and they show in thin sections the same structure as the oolites of the phosphate beds. The oolites of the limestones are calcium carbonate; and the oolites of the phosphate bed are calcium phosphate.

Q. Now, Mr. Weeks, as a result of your examination of the properties in dispute in these claims, placer and lode, as well as your examination of and

(Testimony of Fred B. Weeks.)

experience with this phosphate rock in the Western field, and the result of your experience and training in mining and geology; I will ask you whether or not this phosphate rock is a vein or lode of valuable deposits?

A. It is not a vein or lode, in any sense of the term.

Q. Is this phosphate vein or lode a quartz or other rock in place? A. No, sir. **[626]**

Q. In short, is this a vein or lode at all?

A. No, it is not.

Q. Is this phosphate rock in place?

A. Why, it is in place in the same sense that the limestones above and below it are in place—the same as any rock mass is in place.

Q. That is, as constituting a part of the mass of the mountain? A. Yes, sir.

Q. Now, does this phosphate rock bear a valuable mineral or ore? That is to say, is it mined for any mineral or ore that it contains; or is it mined and used for itself, as a whole?

A. It is not mined for any constituent part of the rock at all. The rock as a whole is mined and used, or the stratum or bed of the phosphate is used as a whole.

Q. Mr. Weeks, I wish you would just describe briefly—very briefly—if you are able to, from your studies as a geologist, what is known as the Witwaters rand mine in Africa?

A. The Witwaters rand contains many mines which are located on a deposit of conglomerate rock;

(Testimony of Fred B. Weeks.)

that is, something similar to gravel. After the deposit of this conglomerate it was raised above the ocean bottom, and there were intruded beneath it and into it a large amount of igneous materials.

Q. In solution?

A. No, not in solution, but as a plastic mass of igneous material. This conglomerate deposit is valuable for its gold. This gold is not contained in the conglomerate rock or pebbles, **[627]** but in the cementing material which binds these pebbles together. There is no evidence that the gold contents were deposited at the time of the formation of the consolidation of the conglomerate bed itself, but that it received its valuable contents of gold from the mineral-bearing solutions which penetrated the conglomerate rock, along with the irruptive material which was injected into it. So that we have in that case a typical vein or lode formation.

Q. How is asphaltum or gypsum formed?

A. They are both formed as sedimentary deposits.

Q. And do they ever come into place in the manner in which a vein deposit comes into place?

A. Some forms of asphaltum are found to occur as true fissure veins; that is, as filling a fissure.

Q. Calling your attention to Gilsonite, is that one of them? A. Yes, sir.

Q. And how does it come into the fissure—in solution or otherwise?

A. It probably came in as a loose—as a plastic mass, and subsequently hardened, and filling the fissure with the hardened material*y*. Originally, when it was injected or forced into the fissure, it

(Testimony of Fred B. Weeks.)

must have been in a plastic condition, at least.

Q. Yes—is it a crystalline deposit?

A. No; it is an amorphous deposit—uncrystalline.

Cross-examination.

(By Judge DEY.) [628]

Q. Mr. Weeks, how much experience have you had in making plats?

A. Why, I have made them at various times for the last twenty years. I have never made a very great many of them, because I am not a very good draughtsman; but I have made quite a good many.

Q. Well, where has your experience been?

A. As a member of the Geological Survey, in making plats and diagrams to represent work that I had done.

Q. In rough?

A. Usually so, because on the Survey we employ draughtsmen for the purpose of doing the work for us. We furnish the rough draft, or the data from which to make them.

Q. And you have never occupied that position of draughtsman? A. No, sir.

Q. Or claim that you are a draughtsman?

A. Well, I claim that I can do as accurate work as any draughtsman; but it may not look as nice. That is the only difference.

Q. Now, if you will step up here to this easel to Defendant's Exhibit 2. Did you place that black line on there merely to represent in a general way, or to accurately represent?

(Testimony of Fred B. Weeks.)

A. It accurately represents what is stated on the legend on Defendant's Exhibit 2.

Q. In other words, you were able to trace upon the surface this lower bed of phosphate?

A. Yes, sir. **[629]**

Q. And you made a survey, of course, to determine the exact course which is platted?

A. Yes, sir.

Q. Who assisted you in that survey?

A. Mr. Bell and I worked together one day, and the principal part of the work I did by myself, with the blue-print in hand of Plaintiff's Exhibit 1, and a compass with which to take directions and dips of the strata. I followed this outcrop of the main lower phosphate bed, and platted upon this blue-print from point to point as I went along the positions.

Q. You kept your notes? A. Yes, sir.

Q. And you have those? A. Yes, sir.

Q. Calling your attention to the gulch southeast of—running southeast of Montpelier Creek: that gulch cuts through the Mount Pleasant lode?

A. Yes, sir.

Q. I notice that the curvature of the line—of the heavy line on Exhibit 2, at the places crossing the gulch, is in opposite directions? A. Yes, sir.

Q. How do you account for that?

A. By the dip of the strata and the slope of the surface, and they are also seen in position by open cuts in the bed itself at those points.

Q. Then, you mean to say that at this gulch, in

(Testimony of Fred B. Weeks.)

one instance the line crossing the gulch is curved in one direction, **[630]** and the other line in the opposite direction; is that correct? A. Yes, sir.

Q. Eh? A. Yes, sir.

Q. Now, tell us again how you figure that out.

A. Why, the position of the bed, as shown in open cuts in the gulch itself, and on the dip of the bed and the slope of the hill.

Q. Why did you not place on this Defendant's Exhibit 2 the upper bed of the phosphate series, or the overhanging limestone—cherty limestone—Mr. Weeks?

A. There are great parts of that area in which that cherty limestone is eroded. For instance, within the Mount Pleasant lode and the Arkansas lode, and in the area between those lodes the overlying cherty limestone which overlies the phosphate series is entirely eroded, and you could not show its presence there.

Q. What has been the cause of the erosion at that point?

A. The natural erosion of the mountain surface.

Q. At Montpelier Creek? A. Yes, sir.

Q. And the gulch? A. Yes, sir.

Q. Now, outside of that limited territory, why did you not place the boundaries I have mentioned on Exhibit 2?

A. Throughout the whole extent of the Waterloo placer the cherty limestone has been entirely eroded, and you could not exhibit it. Upon the Overton, the Cumberland, Fentress, **[631]** Jimtown, Obed

(Testimony of Fred B. Weeks.)

and Obey lodes, the cherty limestone is exposed in places along the side of the ridge above and to the west of the black line.

Q. Why did you not place that on there, or could you place it on there now?

A. It is only exposed at varying points.

Q. Could you place those points on Defendant's Exhibit 2?

A. Why, I could place some of them.

Q. Please do so.

A. But I couldn't say that it would be exactly accurate, but it would be very close to it.

Q. You have your minutes or notes that you took, I understand you? A. Yes, sir.

Q. So that it would be approximately correct?

A. Well, I have not noted in my notes in many cases where the cherty limestone actually outcrops; but I can make an approximate location.

Q. You can mark it as approximately correct as the heavy line is, can't you?

A. No, I couldn't, because it has not been opened by cuts and tunnels and underground workings to show its position, in places where it is not naturally exposed.

Q. So far as you know, will you please place it on Exhibit 2 and cross-sections.

A. How do you wish it marked?

Q. Well, what would you suggest—the upper—what do you call it? **[632]**

A. It has been called on Section A–B "Cherty

(Testimony of Fred B. Weeks.)

Limestone." You can call it that, or just as you like.

Q. All right; that will do. It will be called "Cherty Limestone."

(The witness marked upon the map.)

A. You see, the point is that along—going up this way, that marked as a ridge, the Cherty Limestone is exposed; and that is what I am trying to show on this cross-section.

Judge DEY.—The witness is marking on Defendant's Exhibit 2 with a blue pencil, writing the word "Cherty" over the line drawn by him.

Q. Now, go ahead.

(The witness continued to mark on said map.)

A. According to my recollection, that is the point where the Cherty Limestone was exposed at the surface, where I have marked.

Q. There may be others, but you don't recall them now?

A. It is already marked on this section, A–B.

Q. It is already? A. Yes, sir.

Q. You have given the dip here as being to the West?

(Indicating upon said map.)

A. Yes, sir.

Q. And the degree of dip. Now, about the surface of the mountain to the west; what is the dip or slope?

A. Well, it varies from point to point, from probably 10° or 12°, up to quite steep—35° perhaps.

Q. Where is the steep part? **[633]**

A. Usually in the higher part of the mountain, to

(Testimony of Fred B. Weeks.)

the east of the black line. Of course there are exceptions to that; for instance, along the Mount Pleasant lode, the slope coming up from Montpelier Canyon to the black line is very steep; it is probably more than 35°; and many outcrops of the underlying limestone are shown there, making nearly a cliff. It is a very steep slope.

Q. That is where the erosion occurs?

A. Yes, sir.

Q. Now, there is another separate cross-section here. (Placing Defendant's Exhibit 3 on easel.) On this cross-section the upper bed of phosphate, or the upper cherty limestone is not shown.

A. It has been entirely eroded.

Q. At that place? A. Yes, sir.

Q. Why did you select that place to make a cross-section?

A. I wanted to show its position through the underground workings of the Waterloo mine, where it is well exposed, and where a man could locate it definitely; and it also shows the known extent of the bed on the dip.

Q. You had no purpose of taking a special place where erosion had carried off and taken away the overhanging cherty limestone?

A. No, sir. It is shown on both cross-sections on Defendant's Exhibit 2 as in its position.

Q. If I understand you correctly, we have in both the Idaho and Wyoming ground this deposit found, with the dip and **[634]** strike which you have given? A. Yes, sir.

(Testimony of Fred B. Weeks.)

Q. Did you give the dip and strike in the Wyoming ground?

A. I gave the dip and strike as approximately north and south.

Q. And what was the dip there?

A. In one case the dip is 85° to the east. That is the general dip of the strata.

Q. Eh?

A. That is the general dip of the strata on the Wyoming claims. It is about 85° to the east.

Q. 85° to the east? A. Yes, sir.

Q. And what is the strike?

A. North and south.

Q. What do you find there from your examination in the way of the underlying rock?

A. The underlying rock is a silicious limestone.

Q. And on top of this silicious limestone what did you find? A. The phosphate series.

Q. Of what thickness?

A. About 120 feet thick, I think the entire series is.

Q. And it varies, does it not?

A. Well, I couldn't say as to that, because there are very few places where the entire thickness is shown; but I am giving it where I have measured it, where it is exhibited.

Q. And on top of this series what is there? [635]

A. Cherty limestone.

Q. Forming the upper boundary? A. Yes, sir.

Q. Within this series what do you find?

(Testimony of Fred B. Weeks.)

A. A series of phosphate beds, and limestone and shale.

Q. Can you tell us how silicious some of the dividing beds are in this phosphate series?

A. That, I couldn't say. They probably contain some silica, but not in any considerable amount so that one would call a layer within the phosphate series a silicious limestone.

Q. The question was whether you could answer how silicious it was? A. No, I couldn't.

Q. Now, in both places you found this phosphate series, bounded as you have described, in place in the mass of the mountains, did you not?

A. It is in place exactly as the overlying and underlying rock are in place in the mountain.

Q. And it is in place as much as any other rock is in place in the mountain, is it not—can be in place?

A. Yes, sir—in that way.

Q. Eh?

A. In that way—the same as all its surrounding rocks and associated rocks are in place.

Q. Well, is there any question in your mind about it being in place? A. Oh, I don't think so.

Q. What do you understand by a lode? [636]

A. A lode would be a rock mass containing metallic minerals. It may be that it has some distinct form, and it may have a very irregular form.

Q. It must contain a metallic mineral?

A. Yes, sir.

Q. That is your opinion?

A. Well, it is the opinion of myself and all author-

(Testimony of Fred B. Weeks.)

ities that I know anything about.

Q. Geological authorities?

A. Yes, sir, and mining authorities as well.

Q. Now, what do you understand by a vein?

A. A vein is a material which fills a fissure or crack in the earth's surface, and it may or may not contain valuable material; it may sometimes be present and sometimes absent, and yet be a vein.

Q. What do you understand by a vein containing valuable mineral deposits?

A. A vein containing valuable mineral deposits is one that contains metallic ores—that is, metallic substances—which are in sufficient quantity and in proper combination that they can be profitably extracted.

Q. This asphalt rock is a mineral vein rock, is it not? A. Yes, sir.

Q. But if I understand you correctly, it is lacking in metallic matter? A. Yes, sir.

Q. Would you agree with this definition of a lode or vein, namely: as a body of mineral, or mineral body of rock, within [637] defined boundaries, in the general mass of the mountain?

(No answer.)

Q. That is a definition of a vein?

A. Just read that, Mr. Hamer.

(The last question was repeated.)

A. No, sir.

Q. Eh? A. No, sir.

Q. You wouldn't agree with that? A. No, sir.

Q. Wherein do you differ?

(Testimony of Fred B. Weeks.)

A. It might be mineral-bearing without containing metallic minerals.

Q. That is the only difference? A. Yes, sir.

Q. In the ground under consideration in these several cases, do you find any conditions not complying with the definition I have just asked you about?

A. Yes, sir.

Q. What?

A. They don't contain any metallic minerals—

Q. I will read you again. Supposing that a vein or lode is a body of mineral or mineral body of rock within defined boundaries in the general mass of the mountain; would you say that the deposit or deposits in question come within such a definition?

A. They do not.

Q. In what respect do they differ?

A. They differ in respect to its metallic contents; but [638] the definition you have given is not a comprehensive definition of a vein; therefore this deposit varies from the proper definition of a vein.

Q. I am asking you upon the definition I gave you, whether proper or otherwise. If you don't understand it, the Reporter will read it.

A. I think I understand it. My statement is that it differs from it because of its lack of metallic contents.

Q. Was there anything implying metallic contents in the definition I suggested? A. No, sir.